

SAF-RC-232
100-IU-2 & 100-IU-6 Remaining
Waste Sites – Soil Full Protocol
FINAL VALIDATION PACKAGE

COMPLETE COPY OF VALIDATION PACKAGE TO:

Kathy Wendt

H4-21

KW 4/14/14
INITIAL/DATE

COMMENTS:

SDG XP0049

SAF-RC-232

Sample Location: 600-382

Date: 14 April 2014
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-382
Subject: Polyaromatic Hydrocarbon/Herbicide - Data Package No. XP0049-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0049 prepared by GEL Laboratories (GEL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T973	2/4/14	Soil	C	See note 1
J1T974	2/4/14	Soil	C	See note 1
J1T975	2/4/14	Soil	C	See note 1
J1T976	2/4/14	Soil	C	See note 1
J1T977	2/4/14	Soil	C	See note 1
J1T978	2/4/14	Soil	C	See note 1

1 – Polyaromatic Hydrocarbons by 3550B & herbicides by 8151A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Analytes must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-

detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field (equipment) Blanks

No field blanks were submitted for analysis.

Accuracy

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to matrix spike and matrix spike duplicate recoveries outside QC limits (0% & 0%), all dalapon results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1T973/J1T978) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria.

Eighteen herbicide results exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

Completeness

Data package No. XP0049 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to matrix spike and matrix spike duplicate recoveries outside QC limits (0% & 0%), all dalapon results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

POLYAROMATIC HYDROCARBON & HERBCIDE DATA QUALIFICATION
SUMMARY*

SDG: XP0049	REVIEWER: ELR	Project: 600-382	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Dalapon	J	All	MS & MSD recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T973
Sample ID: 342714001
Matrix: SOIL
Collect Date: 04-FEB-14 08:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 1.85%

Project: WCHN00213
Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.08	5.08	16.9	ug/kg	1	CWW	02/13/14	1146	1365968	1
Acenaphthylene	X	189	5.08	16.9	ug/kg	1					
Anthracene	U	1.69	1.69	16.9	ug/kg	1					
Benzo(a)anthracene	U	0.542	0.542	1.69	ug/kg	1					
Benzo(a)pyrene	U	0.542	0.542	1.69	ug/kg	1					
Benzo(b)fluoranthene	U	0.542	0.542	1.69	ug/kg	1					
Benzo(ghi)perylene	PX	2.16	0.542	1.69	ug/kg	1					
Benzo(k)fluoranthene	U	0.271	0.271	0.847	ug/kg	1					
Chrysene	U	0.542	0.542	1.69	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.542	0.542	1.69	ug/kg	1					
Fluoranthene	U	0.542	0.542	1.69	ug/kg	1					
Fluorene	U	5.08	5.08	16.9	ug/kg	1					
Indeno(1,2,3-cd)pyrene	X	4.43	0.542	1.69	ug/kg	1					
Naphthalene	U	5.08	5.08	16.9	ug/kg	1					
Phenanthrene	U	5.08	5.08	16.9	ug/kg	1					
Pyrene	U	0.542	0.542	1.69	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	02/11/14	1735	1365967

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	5870 ug/kg	8470	69.3	(23%-104%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T974
 Sample ID: 342714002
 Matrix: SOIL
 Collect Date: 04-FEB-14 08:50
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 14.8%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.87	5.87	19.6	ug/kg	1	CWW	02/13/14	1229	1365968	1
Acenaphthylene	U	5.87	5.87	19.6	ug/kg	1					
Anthracene	U	1.96	1.96	19.6	ug/kg	1					
Benzo(a)anthracene	U	0.626	0.626	1.96	ug/kg	1					
Benzo(a)pyrene	U	0.626	0.626	1.96	ug/kg	1					
Benzo(b)fluoranthene	U	0.626	0.626	1.96	ug/kg	1					
Benzo(ghi)perylene	J	0.685	0.626	1.96	ug/kg	1					
Benzo(k)fluoranthene	U	0.313	0.313	0.978	ug/kg	1					
Chrysene	U	0.626	0.626	1.96	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.626	0.626	1.96	ug/kg	1					
Fluoranthene	J	1.37	0.626	1.96	ug/kg	1					
Fluorene	U	5.87	5.87	19.6	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.626	0.626	1.96	ug/kg	1					
Naphthalene	U	5.87	5.87	19.6	ug/kg	1					
Phenanthrene	U	5.87	5.87	19.6	ug/kg	1					
Pyrene	J	1.72	0.626	1.96	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/11/14	1735	1365967

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8310		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	5710 ug/kg	9780	58.4	(23%-104%)

Notes:

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Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T975
 Sample ID: 342714003
 Matrix: SOIL
 Collect Date: 04-FEB-14 09:20
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 9.67%

Project: WCHN00213

Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.53	5.53	18.4	ug/kg	1	CWW	02/13/14	1435	1365968	1
Acenaphthylene	U	5.53	5.53	18.4	ug/kg	1					
Anthracene	U	1.84	1.84	18.4	ug/kg	1					
Benzo(a)anthracene	U	0.590	0.590	1.84	ug/kg	1					
Benzo(a)pyrene	U	0.590	0.590	1.84	ug/kg	1					
Benzo(b)fluoranthene	U	0.590	0.590	1.84	ug/kg	1					
Benzo(ghi)perylene	U	0.590	0.590	1.84	ug/kg	1					
Benzo(k)fluoranthene	U	0.295	0.295	0.922	ug/kg	1					
Chrysene	U	0.590	0.590	1.84	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.590	0.590	1.84	ug/kg	1					
Fluoranthene	U	0.590	0.590	1.84	ug/kg	1					
Fluorene	U	5.53	5.53	18.4	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.590	0.590	1.84	ug/kg	1					
Naphthalene	U	5.53	5.53	18.4	ug/kg	1					
Phenanthrene	U	5.53	5.53	18.4	ug/kg	1					
Pyrene	U	0.590	0.590	1.84	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXVI	02/11/14	1735	1365967

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 8310				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	6330 ug/kg	9220	68.7	(23%-104%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T976
Sample ID: 342714004
Matrix: SOIL
Collect Date: 04-FEB-14 09:40
Receive Date: 07-FEB-14
Collector: Client
Moisture: 3.47%

Project: WCHN00213
Client ID: WCHN001

Handwritten signature and date: 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.17	5.17	17.2	ug/kg	1	CWW	02/13/14	1518	1365968	1
Acenaphthylene	U	5.17	5.17	17.2	ug/kg	1					
Anthracene	U	1.72	1.72	17.2	ug/kg	1					
Benzo(a)anthracene	U	0.552	0.552	1.72	ug/kg	1					
Benzo(a)pyrene	JP	1.03	0.552	1.72	ug/kg	1					
Benzo(b)fluoranthene	J	0.926	0.552	1.72	ug/kg	1					
Benzo(ghi)perylene	J	0.859	0.552	1.72	ug/kg	1					
Benzo(k)fluoranthene	U	0.276	0.276	0.862	ug/kg	1					
Chrysene	U	0.552	0.552	1.72	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.552	0.552	1.72	ug/kg	1					
Fluoranthene	J	1.21	0.552	1.72	ug/kg	1					
Fluorene	U	5.17	5.17	17.2	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.552	0.552	1.72	ug/kg	1					
Naphthalene	U	5.17	5.17	17.2	ug/kg	1					
Phenanthrene	U	5.17	5.17	17.2	ug/kg	1					
Pyrene	J	1.06	0.552	1.72	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	02/11/14	1735	1365967

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 8310				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	6010 ug/kg	8620	69.7	(23%-104%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T977
 Sample ID: 342714005
 Matrix: SOIL
 Collect Date: 04-FEB-14 10:00
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 2.76%

Project: WCHN00213
 Client ID: WCHN001



Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.14	5.14	17.1	ug/kg	1	CWW	02/13/14	1600	1365968	1
Acenaphthylene	U	5.14	5.14	17.1	ug/kg	1					
Anthracene	U	1.71	1.71	17.1	ug/kg	1					
Benzo(a)anthracene	U	0.548	0.548	1.71	ug/kg	1					
Benzo(a)pyrene	U	0.548	0.548	1.71	ug/kg	1					
Benzo(b)fluoranthene	U	0.548	0.548	1.71	ug/kg	1					
Benzo(ghi)perylene	U	0.548	0.548	1.71	ug/kg	1					
Benzo(k)fluoranthene	U	0.274	0.274	0.856	ug/kg	1					
Chrysene	U	0.548	0.548	1.71	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.548	0.548	1.71	ug/kg	1					
Fluoranthene	JP	0.652	0.548	1.71	ug/kg	1					
Fluorene	U	5.14	5.14	17.1	ug/kg	1					
Indeno(1,2,3-cd)pyrene	U	0.548	0.548	1.71	ug/kg	1					
Naphthalene	U	5.14	5.14	17.1	ug/kg	1					
Phenanthrene	U	5.14	5.14	17.1	ug/kg	1					
Pyrene	J	1.01	0.548	1.71	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	02/11/14	1735	1365967

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	6650 ug/kg	8560	77.7	(23%-104%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T978
 Sample ID: 342714006
 Matrix: SOIL
 Collect Date: 04-FEB-14 08:20
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 1.72%

Project: WCHN00213
 Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
HPLC-PAH											
8310/3550 PAH Std list Soil "Dry Weight Corrected"											
Acenaphthene	U	5.09	5.09	17.0	ug/kg	1	CWW	02/13/14	1848	1365968	1
Acenaphthylene	X	195	5.09	17.0	ug/kg	1					
Anthracene	U	1.70	1.70	17.0	ug/kg	1					
Benzo(a)anthracene	U	0.543	0.543	1.70	ug/kg	1					
Benzo(a)pyrene	U	0.543	0.543	1.70	ug/kg	1					
Benzo(b)fluoranthene	U	0.543	0.543	1.70	ug/kg	1					
Benzo(ghi)perylene	X	2.02	0.543	1.70	ug/kg	1					
Benzo(k)fluoranthene	U	0.271	0.271	0.848	ug/kg	1					
Chrysene	U	0.543	0.543	1.70	ug/kg	1					
Dibenzo(a,h)anthracene	U	0.543	0.543	1.70	ug/kg	1					
Fluoranthene	U	0.543	0.543	1.70	ug/kg	1					
Fluorene	U	5.09	5.09	17.0	ug/kg	1					
Indeno(1,2,3-cd)pyrene	X	4.84	0.543	1.70	ug/kg	1					
Naphthalene	U	5.09	5.09	17.0	ug/kg	1					
Phenanthrene	U	5.09	5.09	17.0	ug/kg	1					
Pyrene	U	0.543	0.543	1.70	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3550B	3550B PAH BY HPLC Prep in soil	AXV1	02/11/14	1735	1365967

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8310	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Decafluorobiphenyl	8310/3550 PAH Std list Soil "Dry Weight Corrected"	5820 ug/kg	8480	68.6	(23%-104%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 20, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T973
Sample ID: 342714001
Matrix: SOIL
Collect Date: 04-FEB-14 08:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 1.85%

Project: WCHN00213
Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	DU	16.9	16.9	50.9	ug/kg	10	RXE1	02/13/14	0124	1365971	1
2,4,5-TP	DU	16.9	16.9	50.9	ug/kg	10					
2,4-D	DU	16.9	16.9	50.9	ug/kg	10					
2,4-DB	DU	16.9	16.9	50.9	ug/kg	10					
Dalapon	DTU	357	357	1020	ug/kg	10					
Dicamba	DU	20.4	20.4	50.9	ug/kg	10					
Dichlorprop	DU	23.0	23.0	50.9	ug/kg	10					
Dinoseb	DU	16.9	16.9	50.9	ug/kg	10					
MCPA	DU	2340	2340	10200	ug/kg	10					
MCP	DU	2040	2040	10200	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXVI	02/11/14	1740	1365970

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	67.9 ug/kg	102	66.6	(38%-142%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 20, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T974
Sample ID: 342714002
Matrix: SOIL
Collect Date: 04-FEB-14 08:50
Receive Date: 07-FEB-14
Collector: Client
Moisture: 14.8%

Project: WCHN00213
Client ID: WCHN001

W 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	DU	19.4	19.4	58.6	ug/kg	10	RXE1	02/13/14	0150	1365971	1
2,4,5-TP	DU	19.4	19.4	58.6	ug/kg	10					
2,4-D	DU	19.4	19.4	58.6	ug/kg	10					
2,4-DB	DU	19.4	19.4	58.6	ug/kg	10					
Dalapon	DTU	410	410	1170	ug/kg	10					
Dicamba	DU	23.4	23.4	58.6	ug/kg	10					
Dichlorprop	DU	26.5	26.5	58.6	ug/kg	10					
Dinoseb	DU	19.4	19.4	58.6	ug/kg	10					
MCPA	DU	2690	2690	11700	ug/kg	10					
MCP	DU	2340	2340	11700	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXVI	02/11/14	1740	1365970

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	
2	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	112 ug/kg	117	95.7	(38%-142%)

Notes:

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 20, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T975
Sample ID: 342714003
Matrix: SOIL
Collect Date: 04-FEB-14 09:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 9.67%

Project: WCHN00213
Client ID: WCHN001

4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	DU	18.4	18.4	55.3	ug/kg	10	RXE1	02/13/14	0216	1365971	1
2,4,5-TP	DU	18.4	18.4	55.3	ug/kg	10					
2,4-D	DU	18.4	18.4	55.3	ug/kg	10					
2,4-DB	DU	18.4	18.4	55.3	ug/kg	10					
Dalapon	DTU	387	387	1110	ug/kg	10					
Dicamba	DU	22.1	22.1	55.3	ug/kg	10					
Dichlorprop	DU	25.0	25.0	55.3	ug/kg	10					
Dinoseb	DU	18.4	18.4	55.3	ug/kg	10					
MCPA	DU	2540	2540	11100	ug/kg	10					
MCP	DU	2210	2210	11100	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/11/14	1740	1365970

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	
2	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	110 ug/kg	111	99.7	(38%-142%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 20, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T976
Sample ID: 342714004
Matrix: SOIL
Collect Date: 04-FEB-14 09:40
Receive Date: 07-FEB-14
Collector: Client
Moisture: 3.47%

Project: WCHN00213
Client ID: WCHN001

Handwritten signature and date: 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	DU	17.2	17.2	51.8	ug/kg	10	RXE1	02/13/14	0335	1365971	1
2,4,5-TP	DU	17.2	17.2	51.8	ug/kg	10					
2,4-D	DU	17.2	17.2	51.8	ug/kg	10					
2,4-DB	DU	17.2	17.2	51.8	ug/kg	10					
Dalapon	DTU	363	363	1040	ug/kg	10					
Dicamba	DU	20.7	20.7	51.8	ug/kg	10					
Dichlorprop	DU	23.4	23.4	51.8	ug/kg	10					
Dinoseb	DU	17.2	17.2	51.8	ug/kg	10					
MCPA	DU	2380	2380	10400	ug/kg	10					
MCPB	DU	2070	2070	10400	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/11/14	1740	1365970

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	SW846 8151A		
2	SW846 8151A		

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	108 ug/kg	104	104	(38%-142%)

Notes:

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 20, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T977
Sample ID: 342714005
Matrix: SOIL
Collect Date: 04-FEB-14 10:00
Receive Date: 07-FEB-14
Collector: Client
Moisture: 2.76%

Project: WCHN00213
Client ID: WCHN001

Handwritten signature and date: 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	DU	17.0	17.0	51.3	ug/kg	10	RXE1	02/13/14	0402	1365971	1
2,4,5-TP	DU	17.0	17.0	51.3	ug/kg	10					
2,4-D	DU	17.0	17.0	51.3	ug/kg	10					
2,4-DB	DU	17.0	17.0	51.3	ug/kg	10					
Dalapon	DTU	359	359	1030	ug/kg	10					
Dicamba	DU	20.5	20.5	51.3	ug/kg	10					
Dichlorprop	DU	23.2	23.2	51.3	ug/kg	10					
Dinoseb	DU	17.0	17.0	51.3	ug/kg	10					
MCPA	DU	2360	2360	10300	ug/kg	10					
MCPB	DU	2050	2050	10300	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/11/14	1740	1365970

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	
2	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	108 ug/kg	103	105	(38%-142%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 20, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T978
Sample ID: 342714006
Matrix: SOIL
Collect Date: 04-FEB-14 08:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 1.72%

Project: WCHN00213
Client ID: WCHN001

V 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-HERB											
8151A Herbicides Soil "Dry Weight Corrected"											
2,4,5-T	DU	16.9	16.9	50.8	ug/kg	10	RXEI	02/13/14	0428	1365971	1
2,4,5-TP	DU	16.9	16.9	50.8	ug/kg	10					
2,4-D	DU	16.9	16.9	50.8	ug/kg	10					
2,4-DB	DU	16.9	16.9	50.8	ug/kg	10					
Dalapon	DTU J	356	356	1020	ug/kg	10					
Dicamba	DU	20.3	20.3	50.8	ug/kg	10					
Dichlorprop	DU	23.0	23.0	50.8	ug/kg	10					
Dinoseb	DU	16.9	16.9	50.8	ug/kg	10					
MCPA	DU	2340	2340	10200	ug/kg	10					
MCPP	DU	2030	2030	10200	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 8151A	8151A Herbicides Prep in Soil	AXV1	02/11/14	1740	1365970

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 8151A	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
2,4-Dichlorophenylacetic acid	8151A Herbicides Soil "Dry Weight Corrected"	74.4 ug/kg	102	73.2	(38%-142%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**Herbicide Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0049**

Method/Analysis Information

Procedure: Analysis of Chlorophenoxy Acid Herbicides by ECD
Analytical Method: SW846 8151A
Prep Method: SW846 8151A
Analytical Batch Number: 1365971
Prep Batch Number: 1365970

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8151A:

Sample ID	Client ID
342714001	J1T973
342714002	J1T974
342714003	J1T975
342714004	J1T976
342714005	J1T977
342714006	J1T978
1203034044	Method Blank (MB)
1203034045	Laboratory Control Sample (LCS)
1203034046	342714003(J1T975) Matrix Spike (MS)
1203034047	342714004(J1T976) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-011 REV# 21.

Raw data reports are processed and reviewed by the analyst using ChemStation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All calibration verification standards (CVS, ICV, or CCV) requirements have not been met for this SDG. The

bracketing standard failed with a negative and/or positive bias for several target analytes. All samples were re-analyzed. Since the bracketing standard failed in a similar manner, the standard failure was attributed to matrix interference. All analytes were within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS(1203034045) did not meet spike recovery acceptance criteria for Dinoseb. Since there were no target analytes detected in the associated client samples, the biased high spike recovery had no adverse impact on the data and the results have been reported.

QC Sample Designation

Sample 342714003 (J1T975) was selected for analysis as the matrix spike and matrix spike duplicate.

Matrix Spike (MS) Recovery Statement

The MS(1203034046(J1T975)) did not meet spike recovery acceptance criteria for Dalapon. The MS was analyzed at a dilution, along with the parent sample and MSD, due to the viscous nature of the extract. As a result, Dalapon was diluted out of the acceptance criteria and the data results have been reported.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries for this SDG were within the established acceptance limits for the reported spike analytes.

MS/MSD Relative Percent Difference (RPD) Statement

The MS(1203034046(J1T975))/MSD(1203034047(J1T976)) did not meet RPD acceptance criteria for Dalapon. The MS was analyzed at a dilution, along with the parent sample and MSD, due to the viscous nature of the extract. The RPD failure was attributed to Dalapon being diluted out of the acceptance limits in the MS. The data results have been reported.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported target analyte concentrations were confirmed on a dissimilar column.

Sample Dilutions

Samples 1203034046 (J1T975), 1203034047 (J1T976), 342714001 (J1T973), 342714002 (J1T974), 342714003 (J1T975), 342714004 (J1T976), 342714005 (J1T977) and 342714006 (J1T978) were analyzed at a dilution due to the viscous nature of the extracts.

Sample Re-extraction/Re-analysis

Samples 1203034044 (MB), 1203034045 (LCS), 1203034046 (J1T975), 1203034047 (J1T976), 342714001 (J1T973), 342714002 (J1T974), 342714003 (J1T975), 342714004 (J1T976), 342714005 (J1T977) and 342714006 (J1T978) were re-analyzed in order to confirm ending check standard (CCV) failure. The original

data results have been reported and the re-analysis data are located in the Miscellaneous Section.

Miscellaneous Information

Electronic Package Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the reviewer name associated with the generation of the data and package. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1267769.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this Herbicide fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

The higher results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS and MSD are from the same analytical column as the parent sample.

Due to rounding differences in the calculation between the forms, the data reported in the Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

Due to software issue, the raw data may not correctly display the updated SPC limits. Please see Sample Data Summary Report and Surrogate Recovery Report for the correct surrogate acceptance limits.

System Configuration

The Semi-Volatiles-HERB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD3A.I_1	Agilent 7890A GC with dual uECD	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide)
ECD3A.I_2	Agilent 7890A GC with dual uECD	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticideII)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

DATA EXCEPTION REPORT			
Mo. Day Yr. 14-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/ECD	Test / Method: SW846 8151A	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1365971	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 342714(XP0049) Application Issues: Failed Recovery for MS/PS Failed RPD for MS/MSD, or PS/PSD Failed Recovery for LCS/LCSD			
Specification and Requirements		DER Disposition:	
Exception Description:			
1. The LCS(1203034045) did not meet spike recovery acceptance criteria for Dinoseb. 2. The MS(1203034046) did not meet spike recovery acceptance criteria for Dalapon. 3. The MS(1203034046)/MSD(1203034047) did not meet RPD acceptance criteria for Dalapon.		1. Since there were no target analytes detected in the associated client samples, the biased high spike recovery had no adverse impact on the data and the results have been reported. 2. The MS was analyzed at a dilution, along with the parent sample and MSD, due to the viscous nature of the extract. As a result, Dalapon was diluted out of the acceptance criteria and the data results have been reported. 3. The MS was analyzed at a dilution, along with the parent sample and MSD, due to the viscous nature of the extract. The RPD failure was attributed to Dalapon being diluted out of the acceptance limits in the MS. The data results have been reported.	

Originator's Name:

Lloyd O Fox 14-FEB-14

Data Validator/Group Leader:


Barbara Bailey 20-FEB-14

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			RC-232-075	Page 1 of 2
Collector JOHNSON, BRADY	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH		Price Code 8B	Data Turnaround
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-382 Subsites	SAF No. RC-232		7 Day		
Ice Chest No. WCH-12-016	Field Logbook No. EL-1666-01	COA 0603822000	Method of Shipment Commerical Carrier - fed Ex			
Shipped To GEL Laboratories Charleston	Offsite Property No. A131049	Bill of Lading/Air Bill No. See OSCP				

Other Labs Shipped To NA	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
	Type of Container	G/P	aG	aG	aG	aG					
	No. of Container(s)	1	1	1	1	1					
	Volume	125mL	125mL	125mL	250mL	125mL					
	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8081; Chloro-Herbicides - EPA8151	PCBs - 8082					

Sample No.	Matrix	Sample Date	Sample Time										
J1T973	SOIL	2-4-14	0820	X	X	X	X	X					
J1T974	SOIL	2-4-14	0850	X	X	X	X	X					
J1T975	SOIL	2-4-14	0920	X	X	X	X	X					
J1T976	SOIL	2-4-14	0940	X	X	X	X	X					
J1T977	SOIL	2-4-14	1000	X	X	X	X	X					

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Brady Johnson	2-4-14/1000	R. Fahlibers	2-4-14 1010
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R. Fahlibers	2-4-14 1530	C. Bingham	2-4-14 1530
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Bingham	2-4-14 1535	1060 Battelle, Fredex	2-4-14 1535
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
1060 Battelle, Fredex	2-5-14 1025	C. Bingham	2-5-14 1025
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Bingham	2-5-14 1030	fed Ex	2-5-14 1030
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
fed Ex	2-5-14 0201H	P. Lent	2-7-14 09:00
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS (1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)	
XP0049	

WCH-EE-011

342714

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-075		Page 2 of 2		
Collector JOHNSON, BRADY		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B		Data Turnaround 7 day	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-382 Subsites		SAF No. RC-232							
Ice Chest No. WCH-12-016		Field Logbook No. EL-1666-01		COA 0603822000		Method of Shipment Commercial Carrier - Fed Ex					
Shipped To GEL Laboratories Charleston		Offsite Property No. A 131049		Bill of Lading/Air Bill No. See OSC							
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C			
		Type of Container		GP	aG	aG	aG	aG			
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1	1			
		Volume		125mL	125mL	125mL	250mL	125mL			
Special Handling and/or Storage cool 4c 342714		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8081; Chloro-Herbicides - EPA8151	PCBs - 8082			
Sample No.	Matrix	Sample Date	Sample Time								
J1T978	SOIL	2-4-14	0820	X	X	X	X	X			
J1T979	SOIL	2-4-14	0815	X							2-4-14 CMB
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)</p> <div style="text-align: center;"> </div>			
Brady Johnson		2-4-14/1010		R. Fahlberg		2-4-14					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
R. Fahlberg		2-4-14 1530		C. Bingham		2-4-14 1530					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
C. Bingham		2-4-14 1535		1060 Battelle, Fridge		2-4-14 1535					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>			
1060 Battelle, Fridge		2-5-14 1025		C. Bingham		2-5-14 1025					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
C. Bingham		2-5-14 1030		Fed Ex							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Fedex		020714 0900		F. Dent Patricia Dent		2/7/14 09:00					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>			
Fedex		020714 0900		F. Dent Patricia Dent		2/7/14 09:00					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		<div style="text-align: center;"> </div>			
WCH-EE-011											

**HPLC-PAH
WC-HANFORD, INC. (WCHN)
SDG XP0049**

Method/Analysis Information

Procedure: Polynuclear Aromatic Hydrocarbons
Analytical Method: SW846 8310
Prep Method: SW846 3550B
Analytical Batch Number: 1365968
Prep Batch Number: 1365967

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 8310:

Sample ID	Client ID
342714001	J1T973
342714002	J1T974
342714003	J1T975
342714004	J1T976
342714005	J1T977
342714006	J1T978
1203034040	Method Blank (MB)
1203034041	Laboratory Control Sample (LCS)
1203034042	342714002(J1T974) Matrix Spike (MS)
1203034043	342714002(J1T974) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP).

The data discussed in this narrative has been analyzed in accordance with GL-OA-E-030 REV# 15.

Raw data reports are processed and reviewed by the analyst using the Target software package. False positives have been removed from the Target quantitation reports per standard operating procedures (SOP) section 18.0.

Calibration Information

Due to software limitations, the files displayed at the beginning of the Form 6 are only the last files uploaded for each individual level. A complete listing of all files used in the current ICAL are shown on the Calibration History that is included with each Level 4 or higher package. The last file by date in each level is the one currently uploaded for that level.

The linear equation used in Target and indicated on the initial calibration summary form is not a conventional linear equation (slope intercept formula) and does not match the equation found in SW-846 method 8000B. The x and y axes are inverted in Target, so that the instrument response is treated as the independent variable (x) and the concentration ratio is treated as the dependent variable (y). The equation used in Target to calculate sample results is adjusted to account for the linear equation inversion and reciprocal slope. The adjusted calculation has been independently verified to produce valid results.

Initial Calibration

All initial calibration requirements have been met for this SDG.

CCV Requirements

All associated calibration verification standards (ICV or CCV) met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All the surrogate recoveries were within the established acceptance criteria for this SDG.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Client sample 342714002 (J1T974) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the MS and MSD met the acceptance limits.

Technical Information:

Holding Time Specifications

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection or sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information:**Data Exception (DER) Documentation**

Data exception reports (DERs) are generated to document procedural anomalies that may deviate from referenced SOP or contractual documents.

A data exception report (DER) was not generated for this SDG.

Manual Integrations

Some initial calibration standards, continuing calibration standards, and/or samples may have required manual integrations due to software limitations.

Please see the raw data in the Miscellaneous Section.

Additional Comments

The Form 8 is used only as a sequence of the analysis.

One or more analytes were detected on both columns or detectors that indicated an acceptable peak within the retention time window and acceptable concentration match in samples 342714001 (J1T973) and 342714006 (J1T978). Although method criteria have been satisfied for reporting a positive result for these analytes, the result is considered a false positive due to matrix interference and/or comparison to the DAD generated spectrum and is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with an 'X' qualifier.

One or more analytes were detected whose concentration greatly differed between the primary and confirmation analysis (greater than 40% difference or RPD) in samples 342714001 (J1T973), 342714004 (J1T976) and 342714005 (J1T977). Because both columns or detectors indicated an acceptable peak in the appropriate retention time window for these analytes, the analytes are reported as positive results. Due to the high percent difference or RPD between the two columns, it is indicated as such on the appropriate Form I/Certificate of Analysis (C of A) with a 'P' qualifier. Those analytes reported with a percent difference or RPD greater than 40% but less than 70% are qualified as presumptive evidence of the presence of the material.

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative of each electronic package will indicate the analyst, reviewer, and report specialist names associated with the generation of the data and package. The data validator will always sign and date the case narrative.

Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

System Configuration

The laboratory utilizes a high performance liquid chromatography (HPLC) instrument configuration for Polynuclear Aromatic Hydrocarbons analyses.

The chromatographic hardware system consists of a HP Model 1100 HPLC with programmable gradient pumping and a 100 uL loop injector.

The HPLC 1100 is coupled to a HP Model G1315A Diode Array UV detector which monitors absorbance at the following five wavelengths: 1) 224 nm; 2) 250 nm; 3) 270 nm; 4) 234 nm; 5) 300 nm.

The HPLC 1100 is also coupled to a HP Model G1321A Fluorescence Detector in series which monitors the following varying excitations and emissions 1) EX 230 nm EM 330 nm; 2) EX 210 nm EM 314 nm; 3) EX 250 nm EM 368 nm; 4) EX 237 nm EM 440 nm; 5) EX 277 nm EM 376 nm; 6) EX 255 nm EM 420 nm; 7) EX 230 nm EM 453 nm.

The Diode Array UV detector is used as the primary detector and the Fluorescence Detector is used as the confirmation detector. All results are reported from the primary Diode Array UV detector.

The HPLC system is identified with a designation of HPLC E in the raw data printouts.

Chromatographic Columns

Chromatographic separation of Polynuclear Aromatic Hydrocarbons is accomplished through analysis on the following reversed phase columns:

Phenomenex: Luna C18 (2), 100 A, 250 mm x 4.6 mm containing 5 um size particle.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-075		Page 1 of 2		
Collector JOHNSON, BRADY		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B		Data Turnaround	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-382 Subsites		SAF No. RC-232				7 Day			
Ice Chest No. WCH-12-016		Field Logbook No. EL-1666-01		COA 0603822000		Method of Shipment Commercial Carrier - fed ex					
Shipped To GEL Laboratories Charleston		Offsite Property No. A131049		Bill of Lading/Air Bill No. See OSPC							
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C			
		Type of Container		G/P	aG	aG	aG	aG			
POSSIBLE SAMPLE HAZARDS/REMARKS <i>None</i>		No. of Container(s)		1	1	1	1	1			
		Volume		125mL	125mL	125mL	250mL	125mL			
		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8081; Chloro-Herbicides - EPA8151	PCBs - 8082			
Special Handling and/or Storage <i>cool 4c</i> 340714											

Sample No.	Matrix	Sample Date	Sample Time									
J1T973	SOIL	2-4-14	0820	X	X	X	X	X				
J1T974	SOIL	2-4-14	0850	X	X	X	X	X				
J1T975	SOIL	2-4-14	0920	X	X	X	X	X				
J1T976	SOIL	2-4-14	0940	X	X	X	X	X				
J1T977	SOIL	2-4-14	1000	X	X	X	X	X				

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>Brad Johnson</i>	2-4-14/1000	<i>R. Fahibers</i>	1010
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>R. Fahibers</i>	2-4-14 1530	<i>C. Bingham</i>	1530
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>C. Bingham</i>	2-4-14 1535	<i>1060 Battelle, Frdge</i>	1535
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>1060 Battelle, Frdge</i>	2-5-14 1025	<i>C. Bingham</i>	1025
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>C. Bingham</i>	2-5-14 1030	<i>fed ex</i>	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>fed ex</i>	2-5-14	<i>P. Went</i>	2-7-14
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
<i>P. Went</i>	09:00		

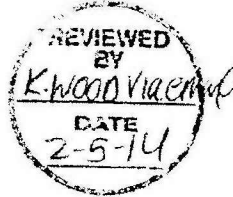
FINAL SAMPLE DISPOSITION

WCH-EE-011

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)

XP0049



272717

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-075		Page 2 of 2		
Collector JOHNSON, BRADY		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B		Data Turnaround 7 day	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-382 Subsites		SAF No. RC-232							
Ice Chest No. WCH-12-016		Field Logbook No. EL-1666-01		COA 0603822000		Method of Shipment Commerical Carrier - Fed Ex					
Shipped To GEL Laboratories Charleston		Offsite Property No. A 131049		Bill of Lading/Air Bill No. See OSPC							
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C			
		Type of Container		G/P	aG	aG	aG	aG			
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1	1			
		Volume		125mL	125mL	125mL	250mL	125mL			
Special Handling and/or Storage cool 4c 342714		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8081, Chloro-Herbicides - EPA8151	PCBs - 8082			
Sample No.	Matrix	Sample Date	Sample Time								
J1T978	SOIL	2-4-14	0820	X	X	X	X	X			
J1T979	SOIL	2-4-14	0815	X						2-4-14 CMB	
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)</p> <div style="text-align: center;"> </div>			
Brady Johnson		2-4-14/1000		R. Fahlberg		2-4-14/1010					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
R. Fahlberg		2-4-14 1530		C. Bingham		2-4-14 1530					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
C. Bingham		2-4-14 1535		1060 Battelle Fridge		2-4-14 1535					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>			
1060 Battelle Fridge		2-5-14 1025		C. Bingham		2-5-14 1025					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
C. Bingham		2-5-14 1030		Fed Ex							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
Fed Ex		020714 0900		P. Dent		2/7/14 09:00					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		XP0049			
WCH-EE-011											

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Appendix 5
Data Validation Supporting Documentation

GENERAL ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT:	600-322		DATA PACKAGE: XP0049		
VALIDATOR:	ELR	LAB:	GCL	DATE: 4/13/14	
			SDG:	XP0049	
ANALYSES PERFORMED					
8015	8021	8141	<u>8151</u>	8315	<u>8310</u>
		WTPH-HCID	WTPH-G	WTPH-D	
SAMPLES/MATRIX:					
J1T973 J1T974 J1T975 J1T976					
J1T977 J1T978					
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A
Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

Initial calibrations acceptable? Yes No N/AContinuing calibrations acceptable? Yes No N/AStandards traceable? Yes No N/AStandards expired? Yes No N/ACalculation check acceptable? Yes No N/A
Comments: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) Yes No N/A
 Calibration blank results acceptable? (Levels D, E) Yes No N/A
 Laboratory blanks analyzed? Yes No N/A
 Laboratory blank results acceptable? Yes No N/A
 Field/trip blanks analyzed? (Levels C, D, E) Yes No N/A
 Field/trip blank results acceptable? (Levels C, D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Comments: no MB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? Yes No N/A
 Surrogate/system monitoring compound recoveries acceptable? Yes No N/A
 Surrogates traceable? (Levels D, E) Yes No N/A
 Surrogates expired? (Levels D, E) Yes No N/A
 MS/MSD samples analyzed? Yes No N/A
 MS/MSD results acceptable? Yes No N/A
 MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
 MS/MSD standards expired? (Levels D, E) Yes No N/A
 LCS/BSS samples analyzed? Yes No N/A
 LCS/BSS results acceptable? Yes No N/A
 Standards traceable? (Levels D, E) Yes No N/A
 Standards expired? (Levels D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable? Yes No N/A
 Comments: data open MS/MSD - 0% + 0% - J au

nono PAS

GENERAL ORGANIC DATA VALIDATION CHECKLIST**5. PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable? Yes No N/A
Duplicate results acceptable? Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
MS/MSD standards expired? (Levels D, E) Yes No N/A
Field duplicate RPD values acceptable? Yes No N/A
Field split RPD values acceptable? Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

6. HOLDING TIMES (all levels)

Samples properly preserved? Yes No N/A
Sample holding times acceptable? Yes No N/A

Comments: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? Yes No N/A
 Results supported in the raw data? (Levels D, E) Yes No N/A
 Samples properly prepared? (Levels D, E) Yes No N/A
 Detection limits meet RDL? Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Comments: _____

~~III~~ ~~III~~ ~~III~~ ~~III~~ - Herbicide on

9. SAMPLE CLEANUP (Levels D and E)

Fluoridil ® (or other aborbant) cleanup performed? Yes No N/A
 Lot check performed? Yes No N/A
 Check recoveries acceptable? Yes No N/A
 Check materials traceable? Yes No N/A
 Check materials Expired? Yes No N/A
 Analytical batch QC given similar cleanup? Yes No N/A
 Transcription/Calculation Errors? Yes No N/A
 Comments: _____

Appendix 6
Additional Documentation Requested by Client

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: February 14, 2014

Page 1 of 4

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH										
Batch	1365968									
QC1203034041	LCS									
Acenaphthene	1670		1280	ug/kg	76.8	(58%-99%)	CWW	02/13/14	11:04	
Acenaphthylene	1670		1270	ug/kg	76.5	(58%-98%)				
Anthracene	1670		1490	ug/kg	89.4	(63%-94%)				
Benzo(a)anthracene	167		143	ug/kg	85.7	(73%-98%)				
Benzo(a)pyrene	167		134	ug/kg	80.7	(63%-99%)				
Benzo(b)fluoranthene	167		140	ug/kg	84	(70%-130%)				
Benzo(ghi)perylene	167		138	ug/kg	83.1	(70%-130%)				
Benzo(k)fluoranthene	83.3		65.1	ug/kg	78.2	(70%-130%)				
Chrysene	167		160	ug/kg	95.9	(70%-130%)				
Dibenzo(a,h)anthracene	167		164	ug/kg	98.3	(70%-130%)				
Fluoranthene	167		136	ug/kg	81.6	(70%-130%)				
Fluorene	1670		1340	ug/kg	80.5	(65%-130%)				
Indeno(1,2,3-cd)pyrene	167		150	ug/kg	89.9	(70%-130%)				
Naphthalene	1670		1230	ug/kg	73.8	(57%-130%)				
Phenanthrene	1670		1370	ug/kg	82	(70%-130%)				
Pyrene	167		147	ug/kg	88.4	(70%-130%)				
**Decafluorobiphenyl	8330		6230	ug/kg	74.8	(23%-104%)				
QC1203034040	MB									
Acenaphthene		U	4.99	ug/kg					02/13/14	10:22
Acenaphthylene		U	4.99	ug/kg						

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Page 2 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1365968										
Anthracene			U	1.66	ug/kg						
Benzo(a)anthracene			U	0.532	ug/kg				CWW	02/13/14	10:22
Benzo(a)pyrene			U	0.532	ug/kg						
Benzo(b)fluoranthene			U	0.532	ug/kg						
Benzo(ghi)perylene			U	0.532	ug/kg						
Benzo(k)fluoranthene			U	0.266	ug/kg						
Chrysene			U	0.532	ug/kg						
Dibenzo(a,h)anthracene			U	0.532	ug/kg						
Fluoranthene			U	0.532	ug/kg						
Fluorene			U	4.99	ug/kg						
Indeno(1,2,3-cd)pyrene			U	0.532	ug/kg						
Naphthalene			U	4.99	ug/kg						
Phenanthrene			U	4.99	ug/kg						
Pyrene			U	0.532	ug/kg						
**Decafluorobiphenyl	8320			5910	ug/kg		71	(23%-104%)			
QC1203034042 342714002 MS											
Acenaphthene	1950	U	5.87	1320	ug/kg		67.4	(49%-90%)		02/13/14	13:11
Acenaphthylene	1950	U	5.87	1310	ug/kg		67.1	(48%-97%)			
Anthracene	1950	U	1.96	1500	ug/kg		76.9	(49%-91%)			
Benzo(a)anthracene	195	U	0.626	139	ug/kg		71.2	(29%-126%)			
Benzo(a)pyrene	195	U	0.626	137	ug/kg		70.3	(26%-130%)			
Benzo(b)fluoranthene	195	U	0.626	136	ug/kg		69.5	(32%-135%)			
Benzo(ghi)perylene	195	J	0.685	133	ug/kg		67.8	(34%-125%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Page 3 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch 1365968											
Benzo(k)fluoranthene	97.7	U	0.313	63.5	ug/kg		65	(48%-142%)	CWW	02/13/14	13:11
Chrysene	195	U	0.626	155	ug/kg		79.1	(39%-127%)			
Dibenzo(a,h)anthracene	195	U	0.626	158	ug/kg		80.8	(38%-130%)			
Fluoranthene	195	J	1.37	133	ug/kg		67.3	(20%-139%)			
Fluorene	1950	U	5.87	1360	ug/kg		69.3	(51%-90%)			
Indeno(1,2,3-cd)pyrene	195	U	0.626	141	ug/kg		72.1	(41%-145%)			
Naphthalene	1950	U	5.87	1270	ug/kg		65.2	(43%-87%)			
Phenanthrene	1950	U	5.87	1380	ug/kg		70.4	(50%-100%)			
Pyrene	195	J	1.72	145	ug/kg		73.6	(18%-149%)			
**Decafluorobiphenyl	9770		5710	6350	ug/kg		65	(23%-104%)			
QC1203034043 342714002 MSD											
Acenaphthene	1950	U	5.87	1440	ug/kg	9.17	73.9	(0%-30%)		02/13/14	13:53
Acenaphthylene	1950	U	5.87	1440	ug/kg	9.31	73.8	(0%-30%)			
Anthracene	1950	U	1.96	1650	ug/kg	9.55	84.8	(0%-30%)			
Benzo(a)anthracene	195	U	0.626	154	ug/kg	10.1	78.9	(0%-30%)			
Benzo(a)pyrene	195	U	0.626	153	ug/kg	10.9	78.6	(0%-30%)			
Benzo(b)fluoranthene	195	U	0.626	150	ug/kg	9.76	76.8	(0%-30%)			
Benzo(ghi)perylene	195	J	0.685	147	ug/kg	9.67	74.8	(0%-30%)			
Benzo(k)fluoranthene	97.6	U	0.313	70.2	ug/kg	10.0	72	(0%-30%)			
Chrysene	195	U	0.626	170	ug/kg	9.36	87	(0%-30%)			
Dibenzo(a,h)anthracene	195	U	0.626	174	ug/kg	9.78	89.2	(0%-30%)			
Fluoranthene	195	J	1.37	147	ug/kg	10.1	74.7	(0%-30%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 342714 Client SDG: XP0049 Project Description: RC-232 Soil Page 4 of 4

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
HPLC-PAH											
Batch	1365968										
Fluorene	1950	U	5.87	1490	ug/kg	9.68	76.5	(0%-30%)	CWW	02/13/14	13:53
Indeno(1,2,3-cd)pyrene	195	U	0.626	154	ug/kg	9.17	79.1	(0%-30%)			
Naphthalene	1950	U	5.87	1380	ug/kg	7.88	70.6	(0%-30%)			
Phenanthrene	1950	U	5.87	1510	ug/kg	9.58	77.6	(0%-30%)			
Pyrene	195	J	1.72	161	ug/kg	10.1	81.6	(0%-30%)			
**Decafluorobiphenyl	9760		5710	6880	ug/kg		70.6	(23%-104%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

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QC Summary

Report Date: February 20, 2014

Page 1 of 3

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch	1365971										
QC1203034045	LCS										
2,4,5-T	39.9			36.0	ug/kg		90	(52%-137%)	RXE1	02/13/14	00:58
2,4,5-TP	39.9			33.8	ug/kg		84.5	(58%-133%)			
2,4-D	39.9			33.1	ug/kg		82.9	(53%-139%)			
2,4-DB	39.9			35.7	ug/kg		89.3	(61%-139%)			
Dalapon	399			232	ug/kg		58.2	(39%-113%)			
Dicamba	39.9			28.8	ug/kg		72.1	(54%-118%)			
Dichlorprop	39.9			30.4	ug/kg		76.1	(59%-126%)			
Dinoseb	39.9		P	46.3	ug/kg		116 *	(39%-94%)			
MCPA	3990			2930	ug/kg		73.3	(60%-120%)			
MCPP	3990			2170	ug/kg		54.2	(50%-123%)			
**2,4-Dichlorophenylacetic acid	99.9			83.4	ug/kg		83.6	(38%-142%)			
QC1203034044	MB										
2,4,5-T			U	1.66	ug/kg					02/13/14	00:31
2,4,5-TP			U	1.66	ug/kg						
2,4-D			U	1.66	ug/kg						
2,4-DB			U	1.66	ug/kg						
Dalapon			U	35.0	ug/kg						
Dicamba			U	2.00	ug/kg						
Dichlorprop			U	2.26	ug/kg						
Dinoseb			U	1.66	ug/kg						

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch	1365971										
MCPA			U	230	ug/kg						
MCPP			U	200	ug/kg				RXE1	02/13/14	00:31
**2,4-Dichlorophenylacetic acid	99.9			83.3	ug/kg		83.4	(38%-142%)			
QC1203034046 342714003 MS											
2,4,5-T	44.1	DU	18.4 DJ	37.3	ug/kg		84.4	(45%-131%)		02/13/14	02:43
2,4,5-TP	44.1	DU	18.4 DJ	38.7	ug/kg		87.6	(49%-135%)			
2,4-D	44.1	DU	18.4 DJ	35.8	ug/kg		81.1	(53%-135%)			
2,4-DB	44.1	DU	18.4 DJ	48.3	ug/kg		110	(61%-139%)			
Dalapon	441	DTU	387 DTU	386	ug/kg		0 *	(30%-113%)			
Dicamba	44.1	DU	22.1 DJ	41.0	ug/kg		92.9	(48%-124%)			
Dichlorprop	44.1	DU	25.0 DJ	39.1	ug/kg		88.5	(46%-138%)			
Dinoseb	44.1	DU	18.4 DJ	39.4	ug/kg		89.2	(25%-130%)			
MCPA	4410	DU	2540 DJ	3680	ug/kg		83.3	(50%-133%)			
MCPP	4410	DU	2210 DJ	3390	ug/kg		76.8	(47%-123%)			
**2,4-Dichlorophenylacetic acid	110		110	117	ug/kg		106	(38%-142%)			
QC1203034047 342714004 MSD											
2,4,5-T	41.3	DU	17.2 DJ	41.2	ug/kg	9.99	99.7	(0%-32%)		02/13/14	03:09
2,4,5-TP	41.3	DU	17.2 DJ	40.3	ug/kg	4.05	97.4	(0%-31%)			
2,4-D	41.3	DU	17.2 DJ	38.0	ug/kg	6.06	91.9	(0%-70%)			
2,4-DB	41.3	DU	17.2 D	55.9	ug/kg	14.5	135	(0%-27%)			
Dalapon	413	DTU	363 DU	362	ug/kg	N/A	0 *	(0%-18%)			
Dicamba	41.3	DU	20.7 DJ	41.6	ug/kg	1.46	101	(0%-41%)			
Dichlorprop	41.3	DU	23.4 DJ	40.8	ug/kg	4.25	98.7	(0%-40%)			
Dinoseb	41.3	DU	17.2 DJ	40.8	ug/kg	3.46	98.6	(0%-169%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-HERB											
Batch	1365971										
MCPA	4130	DU	2380	DJ	3910	ug/kg	6.07	94.5	(0%-38%)	RXE1	02/13/14 03:09
MCPP	4130	DU	2070	DJ	3810	ug/kg	11.5	92.1	(0%-30%)		
**2,4-Dichlorophenylacetic acid	103		108		117	ug/kg		113	(38%-142%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 14 April 2014
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-382
Subject: Pesticide/PCB - Data Package No. XP0049-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0049 prepared by GEL Laboratories (GEL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T973	2/4/14	Soil	C	See note 1
J1T974	2/4/14	Soil	C	See note 1
J1T975	2/4/14	Soil	C	See note 1
J1T976	2/4/14	Soil	C	See note 1
J1T977	2/4/14	Soil	C	See note 1
J1T978	2/4/14	Soil	C	See note 1

1 – Pesticides by 8081B & PCBs by 8082A.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Analytes must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction. Holding times are not applicable for PCB analysis.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field (equipment) Blanks

No field blanks were submitted for analysis.

Accuracy

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike, matrix spike duplicate and LCS analysis, all toxaphene results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a matrix spike and matrix spike duplicate analysis, all toxaphene results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicate Samples

One set field duplicates (J1T973/J1T978) were submitted for analysis. Laboratory duplicates are compared using the same criteria as for laboratory results. All field duplicate results are acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. Six pesticide analytes exceeded the RQL. Under the WCH statement of work, no qualification is required. All other analytes met the RQL.

Completeness

Data package No. XP0049 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the lack of a matrix spike, matrix spike duplicate and LCS analysis, all toxaphene results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

PESTICIDE/PCB DATA QUALIFICATION SUMMARY*

SDG: XP0049	REVIEWER: ELR	Project: 600-382	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Toxaphene	J	All	No MS, MSD or LCS analysis

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: February 13, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T973
Sample ID: 342714001
Matrix: SOIL
Collect Date: 04-FEB-14 08:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 1.85%

Project: WCHN00213
Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	DU	22.6	22.6	67.9	ug/kg	20	JXM	02/13/14	0751	1366122	1
Aroclor-1221	DU	22.6	22.6	67.9	ug/kg	20					
Aroclor-1232	DU	22.6	22.6	67.9	ug/kg	20					
Aroclor-1242	DU	22.6	22.6	67.9	ug/kg	20					
Aroclor-1248	DU	22.6	22.6	67.9	ug/kg	20					
Aroclor-1254	DU	22.6	22.6	67.9	ug/kg	20					
Aroclor-1260	DU	22.6	22.6	67.9	ug/kg	20					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJWI	02/12/14	0955	1366120

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8082A				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.04 ug/kg	6.79	74.2	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	2.85 ug/kg	6.79	41.9	(35%-119%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 13, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T974
 Sample ID: 342714002
 Matrix: SOIL
 Collect Date: 04-FEB-14 08:50
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 14.8%

Project: WCHN00213
 Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	DU	26.0	26.0	78.1	ug/kg	20	JXM	02/13/14	0805	1366122	1
Aroclor-1221	DU	26.0	26.0	78.1	ug/kg	20					
Aroclor-1232	DU	26.0	26.0	78.1	ug/kg	20					
Aroclor-1242	DU	26.0	26.0	78.1	ug/kg	20					
Aroclor-1248	DU	26.0	26.0	78.1	ug/kg	20					
Aroclor-1254	DU	26.0	26.0	78.1	ug/kg	20					
Aroclor-1260	DU	26.0	26.0	78.1	ug/kg	20					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJW1	02/12/14	0955	1366120

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8082A				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	6.38 ug/kg	7.81	81.7	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	7.63 ug/kg	7.81	97.6	(35%-119%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 13, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T975
 Sample ID: 342714003
 Matrix: SOIL
 Collect Date: 04-FEB-14 09:20
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 9.67%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	DU	24.5	24.5	73.7	ug/kg	20	JXM	02/13/14	0819	1366122	1
Aroclor-1221	DU	24.5	24.5	73.7	ug/kg	20					
Aroclor-1232	DU	24.5	24.5	73.7	ug/kg	20					
Aroclor-1242	DU	24.5	24.5	73.7	ug/kg	20					
Aroclor-1248	DU	24.5	24.5	73.7	ug/kg	20					
Aroclor-1254	DU	24.5	24.5	73.7	ug/kg	20					
Aroclor-1260	DU	24.5	24.5	73.7	ug/kg	20					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJW1	02/12/14	0955	1366120

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8082A				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	6.33 ug/kg	7.37	85.9	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	7.84 ug/kg	7.37	106	(35%-119%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 13, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T976
 Sample ID: 342714004
 Matrix: SOIL
 Collect Date: 04-FEB-14 09:40
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 3.47%

Project: WCHN00213
 Client ID: WCHN001

✓ 2/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	DU	23.0	23.0	69.0	ug/kg	20	JXM	02/13/14	0834	1366122	1
Aroclor-1221	DU	23.0	23.0	69.0	ug/kg	20					
Aroclor-1232	DU	23.0	23.0	69.0	ug/kg	20					
Aroclor-1242	DU	23.0	23.0	69.0	ug/kg	20					
Aroclor-1248	DU	23.0	23.0	69.0	ug/kg	20					
Aroclor-1254	DU	23.0	23.0	69.0	ug/kg	20					
Aroclor-1260	DU	23.0	23.0	69.0	ug/kg	20					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJW1	02/12/14	0955	1366120

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8082A				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.75 ug/kg	6.90	83.3	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	7.43 ug/kg	6.90	108	(35%-119%)

Notes:

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 13, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T977
 Sample ID: 342714005
 Matrix: SOIL
 Collect Date: 04-FEB-14 10:00
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 2.76%

Project: WCHN00213
 Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	DU	22.8	22.8	68.4	ug/kg	20	JXM	02/13/14	0848	1366122	1
Aroclor-1221	DU	22.8	22.8	68.4	ug/kg	20					
Aroclor-1232	DU	22.8	22.8	68.4	ug/kg	20					
Aroclor-1242	DU	22.8	22.8	68.4	ug/kg	20					
Aroclor-1248	DU	22.8	22.8	68.4	ug/kg	20					
Aroclor-1254	DU	22.8	22.8	68.4	ug/kg	20					
Aroclor-1260	DU	22.8	22.8	68.4	ug/kg	20					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJW1	02/12/14	0955	1366120

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8082A				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.85 ug/kg	6.84	85.6	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	7.60 ug/kg	6.84	111	(35%-119%)

Notes:

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Certificate of Analysis

Report Date: February 13, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T978
Sample ID: 342714006
Matrix: SOIL
Collect Date: 04-FEB-14 08:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 1.72%

Project: WCHN00213
Client ID: WCHN001

✓
4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-PCB											
SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"											
Aroclor-1016	DU	22.5	22.5	67.7	ug/kg	20	JXM	02/13/14	1010	1366122	1
Aroclor-1221	DU	22.5	22.5	67.7	ug/kg	20					
Aroclor-1232	DU	22.5	22.5	67.7	ug/kg	20					
Aroclor-1242	DU	22.5	22.5	67.7	ug/kg	20					
Aroclor-1248	DU	22.5	22.5	67.7	ug/kg	20					
Aroclor-1254	DU	22.5	22.5	67.7	ug/kg	20					
Aroclor-1260	DU	22.5	22.5	67.7	ug/kg	20					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 PCB Prep Soil	SJW1	02/12/14	0955	1366120

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8082A				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	6.12 ug/kg	6.77	90.4	(44%-106%)
Decachlorobiphenyl	SW846 3541/8082A PCB Solid Automated Soxhlet "Dry Weight Corrected"	5.27 ug/kg	6.77	77.9	(35%-119%)

Notes:

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Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354

Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T973
 Sample ID: 342714001
 Matrix: SOIL
 Collect Date: 04-FEB-14 08:20
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 1.85%

Project: WCHN00213
 Client ID: WCHN001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	DU	3.39	3.39	13.6	ug/kg	10	RXE1	02/12/14	2112	1365859	1
4,4'-DDE	DU	3.39	3.39	13.6	ug/kg	10					
4,4'-DDT	DU	3.39	3.39	13.6	ug/kg	10					
Aldrin	DU	1.70	1.70	6.79	ug/kg	10					
Dieldrin	DU	3.39	3.39	13.6	ug/kg	10					
Endosulfan I	DU	1.70	1.70	6.79	ug/kg	10					
Endosulfan II	DU	3.39	3.39	13.6	ug/kg	10					
Endosulfan sulfate	DU	3.39	3.39	13.6	ug/kg	10					
Endrin	DU	3.39	3.39	13.6	ug/kg	10					
Endrin aldehyde	DU	3.39	3.39	13.6	ug/kg	10					
Endrin ketone	DU	3.39	3.39	13.6	ug/kg	10					
Heptachlor	DU	1.70	1.70	6.79	ug/kg	10					
Heptachlor epoxide	DU	1.70	1.70	6.79	ug/kg	10					
Methoxychlor	DU	17.0	17.0	67.9	ug/kg	10					
Toxaphene	DU	56.5	56.5	170	ug/kg	10					
alpha-BHC	DU	1.70	1.70	6.79	ug/kg	10					
alpha-Chlordane	DU	1.70	1.70	6.79	ug/kg	10					
beta-BHC	DU	1.70	1.70	6.79	ug/kg	10					
delta-BHC	DU	1.70	1.70	6.79	ug/kg	10					
gamma-BHC (Lindane)	DU	1.70	1.70	6.79	ug/kg	10					
gamma-Chlordane	DU	1.70	1.70	6.79	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	CXR2	02/11/14	1035	1365857

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8081B				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	39.8 ug/kg	33.9	117	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	38.5 ug/kg	33.9	114	(37%-129%)

Notes:

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Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T974
Sample ID: 342714002
Matrix: SOIL
Collect Date: 04-FEB-14 08:50
Receive Date: 07-FEB-14
Collector: Client
Moisture: 14.8%

Project: WCHN00213
Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	DU	3.91	3.91	15.6	ug/kg	10	RXE1	02/12/14	2157	1365859	1
4,4'-DDE	DU	3.91	3.91	15.6	ug/kg	10					
4,4'-DDT	DU	3.91	3.91	15.6	ug/kg	10					
Aldrin	DU	1.95	1.95	7.82	ug/kg	10					
Dieldrin	DU	3.91	3.91	15.6	ug/kg	10					
Endosulfan I	DU	1.95	1.95	7.82	ug/kg	10					
Endosulfan II	DU	3.91	3.91	15.6	ug/kg	10					
Endosulfan sulfate	DU	3.91	3.91	15.6	ug/kg	10					
Endrin	DU	3.91	3.91	15.6	ug/kg	10					
Endrin aldehyde	DU	3.91	3.91	15.6	ug/kg	10					
Endrin ketone	DU	3.91	3.91	15.6	ug/kg	10					
Heptachlor	DU	1.95	1.95	7.82	ug/kg	10					
Heptachlor epoxide	DU	1.95	1.95	7.82	ug/kg	10					
Methoxychlor	DU	19.5	19.5	78.2	ug/kg	10					
Toxaphene	DU	65.1	65.1	195	ug/kg	10					
alpha-BHC	DU	1.95	1.95	7.82	ug/kg	10					
alpha-Chlordane	DU	1.95	1.95	7.82	ug/kg	10					
beta-BHC	DU	1.95	1.95	7.82	ug/kg	10					
delta-BHC	DU	1.95	1.95	7.82	ug/kg	10					
gamma-BHC (Lindane)	DU	1.95	1.95	7.82	ug/kg	10					
gamma-Chlordane	DU	1.95	1.95	7.82	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	CXR2	02/11/14	1035	1365857

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8081B				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	39.4 ug/kg	39.1	101	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	53.0 ug/kg	39.1	136*	(37%-129%)

Notes:

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Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T975
Sample ID: 342714003
Matrix: SOIL
Collect Date: 04-FEB-14 09:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 9.67%

Project: WCHN00213
Client ID: WCHN001

K 4/15/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	DU	3.68	3.68	14.7	ug/kg	10	RXE1	02/12/14	2212	1365859	1
4,4'-DDE	DU	3.68	3.68	14.7	ug/kg	10					
4,4'-DDT	DU	3.68	3.68	14.7	ug/kg	10					
Aldrin	DU	1.84	1.84	7.37	ug/kg	10					
Dieldrin	DU	3.68	3.68	14.7	ug/kg	10					
Endosulfan I	DU	1.84	1.84	7.37	ug/kg	10					
Endosulfan II	DU	3.68	3.68	14.7	ug/kg	10					
Endosulfan sulfate	DU	3.68	3.68	14.7	ug/kg	10					
Endrin	DU	3.68	3.68	14.7	ug/kg	10					
Endrin aldehyde	DU	3.68	3.68	14.7	ug/kg	10					
Endrin ketone	DU	3.68	3.68	14.7	ug/kg	10					
Heptachlor	DU	1.84	1.84	7.37	ug/kg	10					
Heptachlor epoxide	DU	1.84	1.84	7.37	ug/kg	10					
Methoxychlor	DU	18.4	18.4	73.7	ug/kg	10					
Toxaphene	DU	61.3	61.3	184	ug/kg	10					
alpha-BHC	DU	1.84	1.84	7.37	ug/kg	10					
alpha-Chlordane	DU	1.84	1.84	7.37	ug/kg	10					
beta-BHC	DU	1.84	1.84	7.37	ug/kg	10					
delta-BHC	DU	1.84	1.84	7.37	ug/kg	10					
gamma-BHC (Lindane)	DU	1.84	1.84	7.37	ug/kg	10					
gamma-Chlordane	DU	1.84	1.84	7.37	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	CXR2	02/11/14	1035	1365857

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8081B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	36.0 ug/kg	36.8	97.7	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	44.5 ug/kg	36.8	121	(37%-129%)

Notes:

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Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T976
Sample ID: 342714004
Matrix: SOIL
Collect Date: 04-FEB-14 09:40
Receive Date: 07-FEB-14
Collector: Client
Moisture: 3.47%

Project: WCHN00213
Client ID: WCHN001

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4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	DU	3.45	3.45	13.8	ug/kg	10	RXE1	02/12/14	2227	1365859	1
4,4'-DDE	DU	3.45	3.45	13.8	ug/kg	10					
4,4'-DDT	DU	3.45	3.45	13.8	ug/kg	10					
Aldrin	DU	1.72	1.72	6.90	ug/kg	10					
Dieldrin	DU	3.45	3.45	13.8	ug/kg	10					
Endosulfan I	DU	1.72	1.72	6.90	ug/kg	10					
Endosulfan II	DU	3.45	3.45	13.8	ug/kg	10					
Endosulfan sulfate	DU	3.45	3.45	13.8	ug/kg	10					
Endrin	DU	3.45	3.45	13.8	ug/kg	10					
Endrin aldehyde	DU	3.45	3.45	13.8	ug/kg	10					
Endrin ketone	DU	3.45	3.45	13.8	ug/kg	10					
Heptachlor	DU	1.72	1.72	6.90	ug/kg	10					
Heptachlor epoxide	DU	1.72	1.72	6.90	ug/kg	10					
Methoxychlor	DU	17.2	17.2	69.0	ug/kg	10					
Toxaphene	DU	57.4	57.4	172	ug/kg	10					
alpha-BHC	DU	1.72	1.72	6.90	ug/kg	10					
alpha-Chlordane	DU	1.72	1.72	6.90	ug/kg	10					
beta-BHC	DU	1.72	1.72	6.90	ug/kg	10					
delta-BHC	DU	1.72	1.72	6.90	ug/kg	10					
gamma-BHC (Lindane)	DU	1.72	1.72	6.90	ug/kg	10					
gamma-Chlordane	DU	1.72	1.72	6.90	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	CXR2	02/11/14	1035	1365857

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SW846 3541/8081B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	26.3 ug/kg	34.5	76.3	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	31.2 ug/kg	34.5	90.4	(37%-129%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T977
 Sample ID: 342714005
 Matrix: SOIL
 Collect Date: 04-FEB-14 10:00
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 2.76%

Project: WCHN00213
 Client ID: WCHN001

Handwritten signature and date: 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	DU	3.42	3.42	13.7	ug/kg	10	RXE1	02/12/14	2242	1365859	1
4,4'-DDE	DU	3.42	3.42	13.7	ug/kg	10					
4,4'-DDT	DU	3.42	3.42	13.7	ug/kg	10					
Aldrin	DU	1.71	1.71	6.84	ug/kg	10					
Dieldrin	DU	3.42	3.42	13.7	ug/kg	10					
Endosulfan I	DU	1.71	1.71	6.84	ug/kg	10					
Endosulfan II	DU	3.42	3.42	13.7	ug/kg	10					
Endosulfan sulfate	DU	3.42	3.42	13.7	ug/kg	10					
Endrin	DU	3.42	3.42	13.7	ug/kg	10					
Endrin aldehyde	DU	3.42	3.42	13.7	ug/kg	10					
Endrin ketone	DU	3.42	3.42	13.7	ug/kg	10					
Heptachlor	DU	1.71	1.71	6.84	ug/kg	10					
Heptachlor epoxide	DU	1.71	1.71	6.84	ug/kg	10					
Methoxychlor	DU	17.1	17.1	68.4	ug/kg	10					
Toxaphene	DU	57.0	57.0	171	ug/kg	10					
alpha-BHC	DU	1.71	1.71	6.84	ug/kg	10					
alpha-Chlordane	DU	1.71	1.71	6.84	ug/kg	10					
beta-BHC	DU	1.71	1.71	6.84	ug/kg	10					
delta-BHC	DU	1.71	1.71	6.84	ug/kg	10					
gamma-BHC (Lindane)	DU	1.71	1.71	6.84	ug/kg	10					
gamma-Chlordane	DU	1.71	1.71	6.84	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	CXR2	02/11/14	1035	1365857

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8081B				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	31.8 ug/kg	34.2	93.0	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	37.2 ug/kg	34.2	109	(37%-129%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 14, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T978
Sample ID: 342714006
Matrix: SOIL
Collect Date: 04-FEB-14 08:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 1.72%

Project: WCHN00213
Client ID: WCHN001

4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Semi-Volatiles-Pesticide											
8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"											
4,4'-DDD	DU	3.39	3.39	13.5	ug/kg	10	RXE1	02/12/14	2257	1365859	1
4,4'-DDE	DU	3.39	3.39	13.5	ug/kg	10					
4,4'-DDT	DU	3.39	3.39	13.5	ug/kg	10					
Aldrin	DU	1.69	1.69	6.77	ug/kg	10					
Dieldrin	DU	3.39	3.39	13.5	ug/kg	10					
Endosulfan I	DU	1.69	1.69	6.77	ug/kg	10					
Endosulfan II	DU	3.39	3.39	13.5	ug/kg	10					
Endosulfan sulfate	DU	3.39	3.39	13.5	ug/kg	10					
Endrin	DU	3.39	3.39	13.5	ug/kg	10					
Endrin aldehyde	DU	3.39	3.39	13.5	ug/kg	10					
Endrin ketone	DU	3.39	3.39	13.5	ug/kg	10					
Heptachlor	DU	1.69	1.69	6.77	ug/kg	10					
Heptachlor epoxide	DU	1.69	1.69	6.77	ug/kg	10					
Methoxychlor	DU	16.9	16.9	67.7	ug/kg	10					
Toxaphene	DU	56.4	56.4	169	ug/kg	10					
alpha-BHC	DU	1.69	1.69	6.77	ug/kg	10					
alpha-Chlordane	DU	1.69	1.69	6.77	ug/kg	10					
beta-BHC	DU	1.69	1.69	6.77	ug/kg	10					
delta-BHC	DU	1.69	1.69	6.77	ug/kg	10					
gamma-BHC (Lindane)	DU	1.69	1.69	6.77	ug/kg	10					
gamma-Chlordane	DU	1.69	1.69	6.77	ug/kg	10					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	Prep Method 3541 8081B Prep Soil	CXR2	02/11/14	1035	1365857

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	SW846 3541/8081B				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
4cmx	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	50.5 ug/kg	33.9	149*	(32%-120%)
Decachlorobiphenyl	8081B/3541 Pesticide Soil Automated Soxhlet "Dry Weight Corrected"	40.5 ug/kg	33.9	119	(37%-129%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**PCB Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0049**

Method/Analysis Information

Procedure: Analysis of Polychlorinated Biphenyls by ECD
Analytical Method: SW846 3541/8082A
Prep Method: SW846 3541
Analytical Batch Number: 1366122
Prep Batch Number: 1366120

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW846 3541/8082A:

Sample ID	Client ID
342714001	J1T973
342714002	J1T974
342714003	J1T975
342714004	J1T976
342714005	J1T977
342714006	J1T978
1203034433	Method Blank (MB)
1203034434	Laboratory Control Sample (LCS)
1203034437	342714005(J1T977) Matrix Spike (MS)
1203034438	342714005(J1T977) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-040 REV# 20.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

The associated calibration verification standards (ICV or CCV) did not meet the acceptance criteria.

One of the CCV standards bracketing the samples in this SDG failed to meet the acceptance criteria with positive bias. However, this non-compliance had no adverse effects on the data as the Aroclors were not detected in the associated WCHN samples.

All analytes were within the established retention time windows for this method.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

All surrogate recoveries were within the established acceptance criteria for the samples in this SDG in this batch.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 342714005 (J1T977) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries for this SDG were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries for this SDG were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

Technical Information**Holding Time Specifications**

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All reported analyte detections in client and quality control samples were within the established retention time windows. Reported analyte concentrations were confirmed on dissimilar columns. All sample extracts were cleaned using alumina. Additionally, copper was added to all sample extracts to remove sulfur.

Sample Dilutions

Samples 1203034437 (J1T977MS), 1203034438 (J1T977MSD), 342714001 (J1T973), 342714002 (J1T974), 342714003 (J1T975), 342714004 (J1T976), 342714005 (J1T977) and 342714006 (J1T978) were diluted prior to analysis due to the oily matrix of the extracts.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG in this batch.

Miscellaneous Information

Electronic Package Comment

The following package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. A DER was not required for the samples in this SDG in this batch.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this PCB fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

The higher results from either column have been chosen and reported in the data package for the client samples, MB and LCS. The data reported for the MS and MSD are from the same analytical column as the parent sample.

Due to software issue, the surrogate recovery range was not indicated or possibly indicated incorrectly in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate acceptance limits.

Due to rounding differences in the calculation between the forms, the data reported in Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

Aroclors quantitated on the raw data report by ChemStation data system do not necessarily represent positive Aroclor identification. In order for positive identification to be made, the Aroclor must match in pattern and retention time; as well as quantitate relatively close between the primary and confirmation columns, as specified in SW846 method 8000. When these conditions are not met, the Aroclor is reported as a non-detect on the data report.

System Configuration

The Semi-Volatiles-PCB analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD8A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide I)

ECD8A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticide II)
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Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**Pesticide Case Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0049**

Method/Analysis Information

Procedure: Organochlorine Pesticides and Chlorinated Hydrocarbons
Analytical Method: SW846 3541/8081B
Prep Method: SW846 3541
Analytical Batch Number: 1365859
Prep Batch Number: 1365857

Sample Analysis

Sample ID	Client ID
342714001	J1T973
342714002	J1T974
342714003	J1T975
342714004	J1T976
342714005	J1T977
342714006	J1T978
1203033720	Method Blank (MB)
1203033721	Laboratory Control Sample (LCS)
1203033722	342714001(J1T973) Matrix Spike (MS)
1203033723	342714001(J1T973) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-041 REV# 13.

Raw data reports are processed and reviewed by the analyst using ChemStation software. False positives have been removed from the ChemStation quantitation reports per standard operating procedures (SOP).

Calibration Information

A complete list of the initial calibration data files are shown in the Calibration History report located in the Standard Data section of the data package.

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

All calibration verification standards (CVS, ICV, or CCV) requirements have not been met for this SDG. The bracketing standard failed with a negative or positive bias for one or more target analytes. All samples were re-analyzed. The bracketing standard failed in the same manner; therefore, the standard failure is attributed to matrix interference. The initial bracket is reported. One or more of five peaks failed with a negative or positive bias in the multi-component standard bracketing the samples in this SDG; however, the average amount of the five peaks met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Surrogates recovered high on one column only in samples 342714002 (J1T974) and 342714006 (J1T978) due to the dilution necessary to analyze the sample. The data were reported.

Laboratory Control Sample (LCS) Recovery

The laboratory control sample (LCS) spike recoveries met the acceptance limits.

QC Sample Designation

Sample 342714001 (J1T973) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries for this SDG were within the established acceptance limits.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD recoveries for this SDG were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD values between the MS and MSD were within the acceptance limits.

Technical Information:

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG in this analytical batch met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. All reported analyte detections in client and quality control samples were within the established retention time windows.

Sample Dilutions

Samples 342714001 (J1T973), 342714002 (J1T974), 342714003 (J1T975), 342714004 (J1T976), 342714005 (J1T977) and 342714006 (J1T978) were diluted due to the large amount of sediment in the bottom of the extract vial, the yellow color of the sample extracts, and the high concentration of non-target analytes observed in the screening results.

Sample Re-extraction/Re-analysis

Samples were re-analyzed due to bracketing check failure. Check failure confirmed. The re-analysis is reported.

Florisil

Florisil clean-up was not performed on client and quality control samples in this batch.

Miscellaneous Information:

Electronic Package Comment

This package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative.

Data Exception (DER) Documentation

The following DER was generated for this SDG: 1267421

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this pesticide fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The following additional comments were required:

Detected target analytes were reported from the analytical column with the higher concentration. Results below the method detection limit (non-detects) were reported from column one.

Due to software issue, the surrogate recovery range was not indicated or possibly indicated incorrectly in Quantitation Report. Please see Surrogate Recovery Report for correct surrogate recovery acceptance limits.

Due to rounding differences in the calculation between the forms, the data reported in Sample Summary (form 1) and Spike Recovery Report (form 3) may differ slightly from the data reported in Identification Summary (form 10).

System Configuration

The Semi-Volatiles-Pesticide analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
ECD5A.I_1	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP I	30m x 0.25mm, 0.25um (Rtx-CLPesticide)
ECD5A.I_2	Agilent 6890 Gas Chromatograph/Dual ECD w/ 7683 Autosampler	HP6890 Series ECD	Rtx-CLP II	30m x 0.25mm, 0.20um (Rtx-CLPesticide II)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

DATA EXCEPTION REPORT			
Mo. Day Yr. 13-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/ECD	Test / Method: SW846 3541/8081B	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1365859	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 342714(XP0049) Application Issues: Failed Yield for Surrogates			
Specification and Requirements		DER Disposition:	
Exception Description: 1. Surrogates recovered outside of the acceptance limits in samples 342714002 and 342714006.		1. Surrogates recovered high on one column only due to the dilution necessary to analyze the sample. The data are reported.	

Originator's Name:
Rebecca Enzor 13-FEB-14

Data Validator/Group Leader:
Cameron Bearden 14-FEB-14

Washington Closure Hanford			CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-075		Page 1 of 2		
Collector JOHNSON, BRADY			Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B		Data Turnaround	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites			Sampling Location 600-382 Subsites		SAF No. RC-232		7 Day					
Ice Chest No. WCH-12-016			Field Logbook No. EL-1666-01		COA 0603822000		Method of Shipment Commercial Carrier - fed ex					
Shipped To GEL Laboratories Charleston			Offsite Property No. A131049		Bill of Lading/Air Bill No. See O5PC							
Other Labs Shipped To NA			Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C			
			Type of Container		G/P	aG	aG	aG	aG			
			No. of Container(s)		1	1	1	1	1			
			Volume		125mL	125mL	125mL	250mL	125mL			
			Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8081; Chloro-Herbicides - EPA8151	PCBs - 8082			
POSSIBLE SAMPLE HAZARDS/REMARKS None												
Special Handling and/or Storage cool 4c 342714												
Sample No.	Matrix	Sample Date	Sample Time									
J1T973	SOIL	2.4.14	0820	X	X	X	X	X				
J1T974	SOIL	2.4.14	0850	X	X	X	X	X				
J1T975	SOIL	2.4.14	0920	X	X	X	X	X				
J1T976	SOIL	2.4.14	0940	X	X	X	X	X				
J1T977	SOIL	2.4.14	1000	X	X	X	X	X				
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)				
Brad Johnson		2-4-14/1000		R. Fahlgren		1010						
R. Fahlgren		2-4-14 1530		C. Bingham		7530						
C. Bingham		2-4-14 1535		1060 Battelle Frdge		2-4-14 1535						
1060 Battelle Frdge		2-5-14 1025		C. Bingham		2-5-14 1025						
C. Bingham		2-5-14 1030		fed ex								
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center; width: 100px; margin: 0 auto;"> REVIEWED BY K. Wood via email DATE 2-5-14 </div>				
Fed ex		0207H 0901		P. Lent Patrick Dent		2-7-14 09:00						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time						
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		<div style="font-size: 24pt; font-weight: bold;">XP0049</div>				
WCH-EE-011												

342714

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-075		Page 2 of 2		
Collector JOHNSON, BRADY		Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B		Data Turnaround 7 day	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites		Sampling Location 600-382 Subsites		SAF No. RC-232							
Ice Chest No. WCH-12-016		Field Logbook No. EL-1666-01		COA 0603822000		Method of Shipment Commercial Carrier - Fed Ex					
Shipped To GEL Laboratories Charleston		Offsite Property No. A 131049		Bill of Lading/Air Bill No. See OSPC							
Other Labs Shipped To NA		Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C			
		Type of Container		GP	aG	aG	aG	aG			
POSSIBLE SAMPLE HAZARDS/REMARKS None		No. of Container(s)		1	1	1	1	1			
		Volume		125mL	125mL	125mL	250mL	125mL			
		Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8081; Chloro-Herbicides - EPA8151	PCBs - 8082			
Special Handling and/or Storage cool 4c 342714											
Sample No.	Matrix	Sample Date	Sample Time								
J1T978	SOIL	2-4-14	0820	X	X	X	X	X			
J1T979	SOIL	2-4-14	0815	X							2-4-14 CMB
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)			
Brady Johnson		2-4-14/1000		R. F. Allen		2-4-14/1530					
R. F. Allen		2-4-14/1530		S. Bingham		2-4-14/1535					
S. Bingham		2-4-14/1535		1060 Battelle		2-4-14/1025					
1060 Battelle		2-5-14/1025		S. Bingham		2-5-14/1025					
S. Bingham		2-5-14/1030		Fed Ex							
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		REVIEWED BY K. Woodruff DATE 2-5-14			
Fed Ex		020714 0900		P. Dent		2/7/14 09:00					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time		XP0049			
WCH-EE-011											

Appendix 5
Data Validation Supporting Documentation

PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT:	600-382		DATA PACKAGE: XP0049		
VALIDATOR:	FLR	LAB:	Ge	DATE: 4/13/14	
			SDG: XP0049		
ANALYSES PERFORMED					
<u>SW-846 8081</u>	SW-846 8081 (TCLP)	<u>SW-846 8082</u>	SW-846 8081 (TCLP)		
SAMPLES/MATRIX					
J1T973	J1T974	J1T975	J1T975		
J1T976	J1T977	J1T978			
				Soil	

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations acceptable? Yes No N/AContinuing calibrations acceptable? Yes No N/AStandards traceable? Yes No N/AStandards expired? Yes No N/ACalculation check acceptable? Yes No N/ADDT and endrin breakdowns acceptable? Yes No N/A

Comments: _____

PCB DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) Yes No N/A
 Calibration blank results acceptable? (Levels D, E) Yes No N/A
 Laboratory blanks analyzed? Yes No N/A
 Laboratory blank results acceptable? Yes No N/A
 Field/trip blanks analyzed? (Levels C, D, E) Yes No N/A
 Field/trip blank results acceptable? (Levels C, D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Comments: no PB

4. ACCURACY (Levels C, D, and E)

Surrogates analyzed? Yes No N/A
 Surrogate recoveries acceptable? Yes No N/A
 Surrogates traceable? (Levels D, E) Yes No N/A
 Surrogates expired? (Levels D, E) Yes No N/A
 MS/MSD samples analyzed? Yes No N/A
 MS/MSD results acceptable? Yes No N/A
 MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
 MS/MSD standards expired? (Levels D, E) Yes No N/A
 LCS/BSS samples analyzed? Yes No N/A
 LCS/BSS results acceptable? Yes No N/A
 Standards traceable? (Levels D, E) Yes No N/A
 Standards expired? (Levels D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable? Yes No N/A
 Comments: no top ms/msd/lcs - Jall
no PB

PCB DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ☒ Yes No N/A
 Duplicate results acceptable? ☒ Yes No N/A
 MS/MSD standards NIST traceable? (Levels D, E) Yes No ☒ N/A
 MS/MSD standards expired? (Levels D, E) Yes No ☒ N/A
 Field duplicate RPD values acceptable? ☒ Yes No N/A
 Field split RPD values acceptable? Yes No ☒ N/A
 Transcription/calculation errors? (Levels D, E) Yes No ☒ N/A

Comments: _____

No for MS/MSD - I all

6. SYSTEM PERFORMANCE (Levels D and E)

Chromatographic performance acceptable? Yes No ☒ N/A
 Positive results resolved acceptably? Yes No ☒ N/A

Comments: _____

7. HOLDING TIMES (all levels)

Samples properly preserved? ☒ Yes No N/A
 Sample holding times acceptable? ☒ Yes No N/A

Comments: _____

PCB DATA VALIDATION CHECKLIST

8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Compound identification acceptable? (Levels D, E) Yes No N/A
 Compound quantitation acceptable? (Levels D, E) Yes No N/A
 Results reported for all requested analyses? Yes No N/A
 Results supported in the raw data? (Levels D, E) Yes No N/A
 Samples properly prepared? (Levels D, E) Yes No N/A
 Detection limits meet RDL? Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Comments: _____

6 test one

9. SAMPLE CLEANUP (Levels D and E)

Fluorilic ® (or other absorbent) cleanup performed? Yes No N/A
 Lot check performed? Yes No N/A
 Check recoveries acceptable? Yes No N/A
 GPC cleanup performed? Yes No N/A
 GPC check performed? Yes No N/A
 GPC check recoveries acceptable? Yes No N/A
 GPC calibration performed? Yes No N/A
 GPC calibration check performed? Yes No N/A
 GPC calibration check retention times acceptable? Yes No N/A
 Check/calibration materials traceable? Yes No N/A
 Check/calibration materials Expired? Yes No N/A
 Analytical batch QC given similar cleanup? Yes No N/A
 Transcription/Calculation Errors? Yes No N/A
 Comments: _____

Appendix 6
Additional Documentation Requested by Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: February 13, 2014

Page 1 of 2

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Paramname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1366122										
QC1203034434	LCS										
Aroclor-1016	33.3			25.0	ug/kg		75.1	(39%-120%)	JXM	02/13/14	07:38
Aroclor-1260	33.3			30.4	ug/kg		91.1	(50%-116%)			
**4cmx	6.67			5.79	ug/kg		86.8	(44%-106%)			
**Decachlorobiphenyl	6.67			6.28	ug/kg		94.2	(35%-119%)			
QC1203034433	MB										
Aroclor-1016			U	1.11	ug/kg					02/13/14	07:26
Aroclor-1221			U	1.11	ug/kg						
Aroclor-1232			U	1.11	ug/kg						
Aroclor-1242			U	1.11	ug/kg						
Aroclor-1248			U	1.11	ug/kg						
Aroclor-1254			U	1.11	ug/kg						
Aroclor-1260			U	1.11	ug/kg						
**4cmx	6.67			5.84	ug/kg		87.6	(44%-106%)			
**Decachlorobiphenyl	6.67			6.91	ug/kg		104	(35%-119%)			
QC1203034437	342714005	MS									
Aroclor-1016	34.3	DU	22.8	DJ	32.8	ug/kg	95.7	(25%-125%)		02/13/14	09:03
Aroclor-1260	34.3	DU	22.8	DJ	35.6	ug/kg	104	(28%-127%)			
**4cmx	6.85		5.85	5.82	ug/kg		84.9	(44%-106%)			
**Decachlorobiphenyl	6.85		7.60	7.02	ug/kg		103	(35%-119%)			
QC1203034438	342714005	MSD									
Aroclor-1016	34.2	DU	22.8	DJ	32.5	ug/kg	0.895	95.1	(0%-30%)	02/13/14	09:17

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-PCB											
Batch	1366122										
Aroclor-1260	34.2	DU	22.8	DJ	35.5	ug/kg	0.208	104	(0%-30%)		
**4cmx	6.84		5.85		5.69	ug/kg		83.2	(44%-106%)	JXM	02/13/14 09:17
**Decachlorobiphenyl	6.84		7.60		7.15	ug/kg		105	(35%-119%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

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QC Summary

Report Date: February 14, 2014

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WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Semi-Volatiles-Pesticide									
Batch	1365859								
QC1203033721	LCS								
4,4'-DDD	41.6		38.3	ug/kg		92.1	(51%-124%)	RXE1	02/12/14 20:58
4,4'-DDE	41.6		36.9	ug/kg		88.8	(51%-119%)		
4,4'-DDT	41.6		38.0	ug/kg		91.2	(50%-128%)		
Aldrin	16.6		13.7	ug/kg		82.3	(48%-113%)		
Dieldrin	41.6		33.2	ug/kg		79.7	(51%-112%)		
Endosulfan I	16.6		12.8	ug/kg		76.6	(43%-110%)		
Endosulfan II	41.6		32.2	ug/kg		77.4	(49%-111%)		
Endosulfan sulfate	41.6		37.6	ug/kg		90.3	(54%-121%)		
Endrin	41.6		41.3	ug/kg		99.3	(54%-134%)		
Endrin aldehyde	41.6		36.1	ug/kg		86.9	(49%-117%)		
Endrin ketone	41.6		33.0	ug/kg		79.4	(48%-110%)		
Heptachlor	16.6		14.1	ug/kg		84.8	(52%-117%)		
Heptachlor epoxide	16.6		13.6	ug/kg		81.6	(53%-115%)		
Methoxychlor	166		154	ug/kg		92.7	(48%-117%)		
alpha-BHC	16.6		14.0	ug/kg		84.2	(50%-122%)		
alpha-Chlordane	16.6		13.8	ug/kg		82.8	(52%-113%)		
beta-BHC	16.6		14.4	ug/kg		86.5	(54%-110%)		
delta-BHC	16.6		14.8	ug/kg		89	(53%-117%)		
gamma-BHC (Lindane)	16.6		14.0	ug/kg		84.2	(53%-120%)		
gamma-Chlordane	16.6		15.2	ug/kg		91.6	(52%-117%)		

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1365859											
**4cmx	33.3			27.5	ug/kg		82.7	(32%-120%)	RXE1	02/12/14	20:58
**Decachlorobiphenyl	33.3			28.9	ug/kg		86.8	(37%-129%)			
QC1203033720 MB											
4,4'-DDD			U	0.333	ug/kg					02/12/14	20:43
4,4'-DDE			U	0.333	ug/kg						
4,4'-DDT			U	0.333	ug/kg						
Aldrin			U	0.166	ug/kg						
Dieldrin			U	0.333	ug/kg						
Endosulfan I			U	0.166	ug/kg						
Endosulfan II			U	0.333	ug/kg						
Endosulfan sulfate			U	0.333	ug/kg						
Endrin			U	0.333	ug/kg						
Endrin aldehyde			U	0.333	ug/kg						
Endrin ketone			U	0.333	ug/kg						
Heptachlor			U	0.166	ug/kg						
Heptachlor epoxide			U	0.166	ug/kg						
Methoxychlor			U	1.66	ug/kg						
Toxaphene			U	5.54	ug/kg						
alpha-BHC			U	0.166	ug/kg						
alpha-Chlordane			U	0.166	ug/kg						
beta-BHC			U	0.166	ug/kg						
delta-BHC			U	0.166	ug/kg						

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1365859											
gamma-BHC (Lindane)			U	0.166	ug/kg				RXE1	02/12/14	20:43
gamma-Chlordane			U	0.166	ug/kg						
**4cmx	33.3			26.3	ug/kg		79.2	(32%-120%)			
**Decachlorobiphenyl	33.3			26.8	ug/kg		80.5	(37%-129%)			
QC1203033722 342714001 MS											
4,4'-DDD	42.4	DU	3.39 D	38.7	ug/kg		91.4	(37%-134%)		02/12/14	21:27
4,4'-DDE	42.4	DU	3.39 D	38.5	ug/kg		91	(33%-133%)			
4,4'-DDT	42.4	DU	3.39 D	31.5	ug/kg		74.4	(21%-149%)			
Aldrin	16.9	DU	1.70 D	14.5	ug/kg		85.8	(34%-134%)			
Dieldrin	42.4	DU	3.39 D	33.5	ug/kg		79.1	(36%-132%)			
Endosulfan I	16.9	DU	1.70 D	12.8	ug/kg		75.7	(36%-125%)			
Endosulfan II	42.4	DU	3.39 D	29.1	ug/kg		68.6	(37%-129%)			
Endosulfan sulfate	42.4	DU	3.39 D	32.2	ug/kg		76	(31%-140%)			
Endrin	42.4	DU	3.39 D	41.4	ug/kg		97.7	(45%-142%)			
Endrin aldehyde	42.4	DU	3.39 D	26.1	ug/kg		61.6	(31%-133%)			
Endrin ketone	42.4	DU	3.39 D	30.4	ug/kg		71.8	(30%-139%)			
Heptachlor	16.9	DU	1.70 D	16.0	ug/kg		94.4	(32%-137%)			
Heptachlor epoxide	16.9	DU	1.70 D	13.3	ug/kg		78.7	(36%-130%)			
Methoxychlor	169	DU	17.0 D	152	ug/kg		89.6	(28%-143%)			
alpha-BHC	16.9	DU	1.70 D	16.1	ug/kg		95	(37%-129%)			
alpha-Chlordane	16.9	DU	1.70 D	14.5	ug/kg		85.7	(29%-141%)			
beta-BHC	16.9	DU	1.70 D	14.6	ug/kg		86.3	(33%-136%)			

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1365859											
delta-BHC	16.9	DU	1.70	D	12.9	ug/kg	76.1	(37%-136%)	RXE1	02/12/14	21:27
gamma-BHC (Lindane)	16.9	DU	1.70	D	16.1	ug/kg	95.2	(35%-130%)			
gamma-Chlordane	16.9	DU	1.70	D	14.8	ug/kg	87.1	(30%-139%)			
**4cmx	33.9		39.8		40.4	ug/kg	119	(32%-120%)			
**Decachlorobiphenyl	33.9		38.5		36.4	ug/kg	107	(37%-129%)			
QC1203033723 342714001 MSD											
4,4'-DDD	42.4	DU	3.39	D	39.2	ug/kg	1.30	92.4	(0%-30%)	02/12/14	21:42
4,4'-DDE	42.4	DU	3.39	D	39.8	ug/kg	3.16	93.7	(0%-30%)		
4,4'-DDT	42.4	DU	3.39	D	31.9	ug/kg	1.13	75.1	(0%-30%)		
Aldrin	17.0	DU	1.70	D	14.8	ug/kg	1.78	87.2	(0%-30%)		
Dieldrin	42.4	DU	3.39	D	33.7	ug/kg	0.520	79.4	(0%-30%)		
Endosulfan I	17.0	DU	1.70	D	13.1	ug/kg	2.00	77.1	(0%-30%)		
Endosulfan II	42.4	DU	3.39	D	30.4	ug/kg	4.33	71.6	(0%-30%)		
Endosulfan sulfate	42.4	DU	3.39	D	34.0	ug/kg	5.39	80.1	(0%-30%)		
Endrin	42.4	DU	3.39	D	40.7	ug/kg	1.61	96	(0%-30%)		
Endrin aldehyde	42.4	DU	3.39	D	26.9	ug/kg	3.11	63.4	(0%-30%)		
Endrin ketone	42.4	DU	3.39	D	31.0	ug/kg	1.82	73	(0%-30%)		
Heptachlor	17.0	DU	1.70	D	15.3	ug/kg	4.16	90.4	(0%-30%)		
Heptachlor epoxide	17.0	DU	1.70	D	13.4	ug/kg	0.166	78.7	(0%-30%)		
Methoxychlor	170	DU	17.0	D	152	ug/kg	0.323	89.7	(0%-30%)		
alpha-BHC	17.0	DU	1.70	D	16.1	ug/kg	0.0443	94.8	(0%-30%)		
alpha-Chlordane	17.0	DU	1.70	D	14.8	ug/kg	2.02	87.3	(0%-30%)		

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QC Summary

Workorder: 342714 Client SDG: XP0049 Project Description: RC-232 Soil Page 5 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Semi-Volatiles-Pesticide											
Batch 1365859											
beta-BHC	17.0	DU	1.70	D	14.4	ug/kg	1.70	84.7	(0%-30%)	RXE1	02/12/14 21:42
delta-BHC	17.0	DU	1.70	D	12.8	ug/kg	0.758	75.4	(0%-30%)		
gamma-BHC (Lindane)	17.0	DU	1.70	D	15.9	ug/kg	1.74	93.4	(0%-30%)		
gamma-Chlordane	17.0	DU	1.70	D	14.8	ug/kg	0.396	87.3	(0%-30%)		
**4cmx	34.0		39.8		39.9	ug/kg		118	(32%-120%)		
**Decachlorobiphenyl	34.0		38.5		35.0	ug/kg		103	(37%-129%)		

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated
- P Aroclor target analyte with greater than 25% difference between column analyses.
- T Spike and/or spike duplicate sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- o Analyte failed to recover within LCS limits (Organics only)

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Date: 14 April 2014
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-382
Subject: Inorganic - Data Package No. XP0049-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0049 prepared by GEL Laboratories (GEL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T973	2/4/14	Soil	C	See note 1
J1T974	2/4/14	Soil	C	See note 1
J1T975	2/4/14	Soil	C	See note 1
J1T976	2/4/14	Soil	C	See note 1
J1T977	2/4/14	Soil	C	See note 1
J1T978	2/4/14	Soil	C	See note 1
J1T979	2/4/14	Soil	C	See note 1

1 – Metals by 6010C & mercury by 7471B.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY PARAMETERS

· Holding Times

Analytical holding times for metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals and 28 days for mercury.

All holding times were acceptable.

Preparation (Method) Blanks

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "UJ". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the contract required detection limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the instrument detection limit (IDL) and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to method blank contamination, the zinc result in sample J1T979 was qualified as undetected and flagged "UJ".

All other preparation blank results were acceptable.

Field (Equipment) Blank

One field blank (J1T979) was submitted for analysis. Ten analytes were detected in the field blank. Under the WCH statement of work, no qualification is required.

Accuracy

Matrix Spike and Laboratory Control Sample

Matrix spike (MS) and laboratory control sample (LCS) analyses are used to assess the analytical accuracy of the reported data. The matrix spike is used to assess the effect of the matrix on the ability to accurately quantify sample concentrations. Recoveries must fall within the range of 75% to 125%. Samples with a recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a recovery of greater than 125% or less than 74% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery outside QC limits, all silicon (0%) results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

· **Precision**

Laboratory Duplicate Samples

Analytical precision is expressed by the relative percent differences (RPD) between the recoveries of matrix spike duplicate (MSD) analyses performed on a sample in the analytical batch. Precision may alternatively be assessed using unspiked duplicate analyses performed on a sample in the analytical batch. If both sample and replicate activities (concentrations) are greater than five times the CRDL and the RPD is less than 30%, no qualification is required. If either activity (concentration) is less than five times the CRDL, the RPD control limit is less than or equal to two times the CRDL. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All laboratory duplicate results were acceptable.

Field Duplicate

One set field duplicates (J1T973/J1T978) were submitted for analysis. Laboratory duplicates are compared using the same criteria as for laboratory results. The RPD for silicon (35.8%) was outside QC limits. Under the WCH statement of work, no qualification is required. All other field duplicate results are acceptable.

· **Analytical Detection Levels**

Reported analytical detection levels are compared against the 100 Area RQLs to ensure that laboratory detection levels meet the required criteria. All results met the RQL.

· **Completeness**

Data package No. XP0049 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to method blank contamination, the zinc result in sample J1T979 was qualified as undetected and flagged "UJ".
- Due to a matrix spike recovery outside QC limits, all silicon (0%) results were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

INORGANICS DATA QUALIFICATION SUMMARY*

SDG: XP0049	REVIEWER: ELR	Project: 600-382	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Zinc	J	J1T979	Method blank contamination
Silicon	J	All	MS recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T973
Sample ID: 342714001
Matrix: SOIL
Collect Date: 04-FEB-14 08:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 1.85%

Project: WCHN00213
Client ID: WCHN001

4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	*U	0.00398	0.00398	0.0119	mg/kg	1	NORI	02/11/14	1004	1365640	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		7160	5.89	17.3	mg/kg	1	HSC	02/12/14	1409	1365353	2
Arsenic	B	1.63	0.433	2.60	mg/kg	1					
Barium		78.4	0.0866	0.433	mg/kg	1					
Beryllium		0.694	0.0866	0.433	mg/kg	1					
Boron	U	0.866	0.866	4.33	mg/kg	1					
Cadmium	B	0.113	0.0866	0.433	mg/kg	1					
Calcium		2800	6.93	21.7	mg/kg	1					
Chromium		11.5	0.130	0.433	mg/kg	1					
Copper		11.9	0.260	0.866	mg/kg	1					
Iron		21500	6.93	21.7	mg/kg	1					
Magnesium		3920	7.36	26.0	mg/kg	1					
Manganese		359	0.173	0.866	mg/kg	1					
Molybdenum	B	0.248	0.173	0.866	mg/kg	1					
Nickel		11.3	0.130	0.433	mg/kg	1					
Silicon	N J	931	1.30	8.66	mg/kg	1					
Potassium		1420	5.54	21.7	mg/kg	1	HSC	02/13/14	0926	1365353	3
Silver	U	0.0866	0.0866	0.433	mg/kg	1					
Sodium		108	6.06	21.7	mg/kg	1					
Antimony	DU	1.43	1.43	4.33	mg/kg	5	HSC	02/14/14	1033	1365353	4
Cobalt	D	8.90	0.650	2.17	mg/kg	5					
Lead	BD	4.11	1.43	4.33	mg/kg	5					
Vanadium	D	57.9	0.433	2.17	mg/kg	5					
Zinc	D	39.8	1.73	4.33	mg/kg	5					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.327	0.327	1.00	mg/kg	2	SKJ	02/12/14	0327	1365351	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/10/14	0900	1365350
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/10/14	0900	1365352
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/10/14	1653	1365636

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Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T974
Sample ID: 342714002
Matrix: SOIL
Collect Date: 04-FEB-14 08:50
Receive Date: 07-FEB-14
Collector: Client
Moisture: 14.8%

Project: WCHN00213
Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	*B	0.00768	0.00464	0.0138	mg/kg	1	NOR1	02/11/14	1016	1365640	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		9530	7.38	21.7	mg/kg	1	HSC	02/12/14	1427	1365353	2
Arsenic	B	2.92	0.543	3.26	mg/kg	1					
Barium		107	0.109	0.543	mg/kg	1					
Beryllium		0.766	0.109	0.543	mg/kg	1					
Boron	U	1.09	1.09	5.43	mg/kg	1					
Cadmium	B	0.124	0.109	0.543	mg/kg	1					
Calcium		3540	8.68	27.1	mg/kg	1					
Chromium		13.8	0.163	0.543	mg/kg	1					
Copper		17.0	0.326	1.09	mg/kg	1					
Iron		22600	8.68	27.1	mg/kg	1					
Magnesium		4940	9.22	32.6	mg/kg	1					
Manganese		389	0.217	1.09	mg/kg	1					
Molybdenum	B	0.284	0.217	1.09	mg/kg	1					
Nickel		13.6	0.163	0.543	mg/kg	1					
Silicon	N J	698	1.63	10.9	mg/kg	1					
Potassium		2440	6.95	27.1	mg/kg	1	HSC	02/13/14	0944	1365353	3
Silver	U	0.109	0.109	0.543	mg/kg	1					
Sodium		138	7.60	27.1	mg/kg	1					
Antimony	DU	1.79	1.79	5.43	mg/kg	5	HSC	02/14/14	1056	1365353	4
Cobalt	D	9.19	0.814	2.71	mg/kg	5					
Lead	BD	4.62	1.79	5.43	mg/kg	5					
Vanadium	D	49.3	0.543	2.71	mg/kg	5					
Zinc	D	45.5	2.17	5.43	mg/kg	5					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.381	0.381	1.16	mg/kg	2	SKJ	02/12/14	0415	1365351	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/10/14	0900	1365350
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/10/14	0900	1365352
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/10/14	1653	1365636

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Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T975
Sample ID: 342714003
Matrix: SOIL
Collect Date: 04-FEB-14 09:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 9.67%

Project: WCHN00213
Client ID: WCHN001

W 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	*	0.169	0.00437	0.013	mg/kg	1	NOR1	02/11/14	1017	1365640	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		7370	7.22	21.2	mg/kg	1	HSC	02/12/14	1430	1365353	2
Arsenic	B	2.96	0.531	3.19	mg/kg	1					
Barium		87.9	0.106	0.531	mg/kg	1					
Beryllium		0.662	0.106	0.531	mg/kg	1					
Boron	U	1.06	1.06	5.31	mg/kg	1					
Cadmium	B	0.106	0.106	0.531	mg/kg	1					
Calcium		2940	8.50	26.6	mg/kg	1					
Chromium		12.9	0.159	0.531	mg/kg	1					
Copper		12.3	0.319	1.06	mg/kg	1					
Iron		20900	8.50	26.6	mg/kg	1					
Magnesium		4240	9.03	31.9	mg/kg	1					
Manganese		376	0.212	1.06	mg/kg	1					
Molybdenum	U	0.212	0.212	1.06	mg/kg	1					
Nickel		11.6	0.159	0.531	mg/kg	1					
Silicon	N	567	1.59	10.6	mg/kg	1					
Potassium		2010	6.80	26.6	mg/kg	1	HSC	02/13/14	0946	1365353	3
Silver	U	0.106	0.106	0.531	mg/kg	1					
Sodium		99.7	7.44	26.6	mg/kg	1					
Antimony	DU	1.75	1.75	5.31	mg/kg	5	HSC	02/14/14	1059	1365353	4
Cobalt	D	9.20	0.797	2.66	mg/kg	5					
Lead	BD	4.58	1.75	5.31	mg/kg	5					
Vanadium	D	52.4	0.531	2.66	mg/kg	5					
Zinc	D	43.1	2.12	5.31	mg/kg	5					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.350	0.350	1.06	mg/kg	2	SKJ	02/12/14	0421	1365351	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/10/14	0900	1365350
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/10/14	0900	1365352
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/10/14	1653	1365636

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Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T976
Sample ID: 342714004
Matrix: SOIL
Collect Date: 04-FEB-14 09:40
Receive Date: 07-FEB-14
Collector: Client
Moisture: 3.47%

Project: WCHN00213
Client ID: WCHN001

Handwritten signature and date: 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	*U	0.00409	0.00409	0.0122	mg/kg	1	NOR1	02/11/14	1019	1365640	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		7880	6.81	20.0	mg/kg	1	HSC	02/12/14	1432	1365353	2
Arsenic	B	2.26	0.501	3.01	mg/kg	1					
Barium		94.7	0.100	0.501	mg/kg	1					
Beryllium		0.654	0.100	0.501	mg/kg	1					
Boron	U	1.00	1.00	5.01	mg/kg	1					
Cadmium	B	0.103	0.100	0.501	mg/kg	1					
Calcium		3040	8.01	25.0	mg/kg	1					
Chromium		13.1	0.150	0.501	mg/kg	1					
Copper		12.3	0.301	1.00	mg/kg	1					
Iron		20700	8.01	25.0	mg/kg	1					
Magnesium		4310	8.52	30.1	mg/kg	1					
Manganese		362	0.200	1.00	mg/kg	1					
Molybdenum	B	0.326	0.200	1.00	mg/kg	1					
Nickel		11.3	0.150	0.501	mg/kg	1					
Silicon	N	558	1.50	10.0	mg/kg	1					
Potassium		2210	6.41	25.0	mg/kg	1	HSC	02/13/14	0949	1365353	3
Silver	U	0.100	0.100	0.501	mg/kg	1					
Sodium		114	7.01	25.0	mg/kg	1					
Antimony	DU	1.65	1.65	5.01	mg/kg	5	HSC	02/14/14	1102	1365353	4
Cobalt	D	8.92	0.751	2.50	mg/kg	5					
Lead	D	5.41	1.65	5.01	mg/kg	5					
Vanadium	D	49.0	0.501	2.50	mg/kg	5					
Zinc	D	49.5	2.00	5.01	mg/kg	5					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.341	0.341	1.03	mg/kg	2	SKJ	02/12/14	0427	1365351	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/10/14	0900	1365350
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/10/14	0900	1365352
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/10/14	1653	1365636

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Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T977
 Sample ID: 342714005
 Matrix: SOIL
 Collect Date: 04-FEB-14 10:00
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 2.76%

Project: WCHN00213
 Client ID: WCHN001

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4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	*U	0.00371	0.00371	0.0111	mg/kg	1	NOR1	02/11/14	1021	1365640	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		5600	6.38	18.8	mg/kg	1	HSC	02/12/14	1435	1365353	2
Arsenic	B	1.48	0.469	2.81	mg/kg	1					
Barium		54.9	0.0938	0.469	mg/kg	1					
Beryllium	B	0.441	0.0938	0.469	mg/kg	1					
Boron	U	0.938	0.938	4.69	mg/kg	1					
Cadmium	U	0.0938	0.0938	0.469	mg/kg	1					
Calcium		2700	7.51	23.5	mg/kg	1					
Chromium		11.3	0.141	0.469	mg/kg	1					
Cobalt		5.52	0.141	0.469	mg/kg	1					
Copper		8.95	0.281	0.938	mg/kg	1					
Iron		16100	7.51	23.5	mg/kg	1					
Lead		1.50	0.310	0.938	mg/kg	1					
Magnesium		3530	7.98	28.1	mg/kg	1					
Manganese		257	0.188	0.938	mg/kg	1					
Molybdenum	U	0.188	0.188	0.938	mg/kg	1					
Nickel		9.17	0.141	0.469	mg/kg	1					
Silicon	N	430	1.41	9.38	mg/kg	1					
Vanadium		38.5	0.0938	0.469	mg/kg	1					
Zinc		32.5	0.375	0.938	mg/kg	1					
Potassium		1150	6.01	23.5	mg/kg	1	HSC	02/13/14	0951	1365353	3
Silver	U	0.0938	0.0938	0.469	mg/kg	1					
Sodium		88.9	6.57	23.5	mg/kg	1					
Antimony	DU	1.55	1.55	4.69	mg/kg	5	HSC	02/14/14	1105	1365353	4
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.331	0.331	1.00	mg/kg	2	SKJ	02/12/14	0433	1365351	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/10/14	0900	1365350
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/10/14	0900	1365352
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/10/14	1653	1365636

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Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T978
 Sample ID: 342714006
 Matrix: SOIL
 Collect Date: 04-FEB-14 08:20
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 1.72%

Project: WCHN00213
 Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	*U	0.00398	0.00398	0.0119	mg/kg	1	NOR1	02/11/14	1022	1365640	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		6860	6.80	20.0	mg/kg	1	HSC	02/12/14	1438	1365353	2
Arsenic	B	2.60	0.500	3.00	mg/kg	1					
Barium		70.8	0.100	0.500	mg/kg	1					
Beryllium		0.620	0.100	0.500	mg/kg	1					
Boron	U	1.00	1.00	5.00	mg/kg	1					
Cadmium	U	0.100	0.100	0.500	mg/kg	1					
Calcium		2570	8.00	25.0	mg/kg	1					
Chromium		11.3	0.150	0.500	mg/kg	1					
Copper		11.5	0.300	1.00	mg/kg	1					
Iron		20600	8.00	25.0	mg/kg	1					
Magnesium		3780	8.50	30.0	mg/kg	1					
Manganese		308	0.200	1.00	mg/kg	1					
Molybdenum	B	0.305	0.200	1.00	mg/kg	1					
Nickel		10.4	0.150	0.500	mg/kg	1					
Silicon	N J	648	1.50	10.0	mg/kg	1					
Potassium		1400	6.40	25.0	mg/kg	1	HSC	02/13/14	0954	1365353	3
Silver	U	0.100	0.100	0.500	mg/kg	1					
Sodium		97.6	7.00	25.0	mg/kg	1					
Antimony	DU	1.65	1.65	5.00	mg/kg	5	HSC	02/14/14	1108	1365353	4
Cobalt	D	7.76	0.750	2.50	mg/kg	5					
Lead	BD	4.40	1.65	5.00	mg/kg	5					
Vanadium	D	50.6	0.500	2.50	mg/kg	5					
Zinc	D	35.4	2.00	5.00	mg/kg	5					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.334	0.334	1.01	mg/kg	2	SKJ	02/12/14	0439	1365351	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/10/14	0900	1365350
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/10/14	0900	1365352
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXS5	02/10/14	1653	1365636

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2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T979
Sample ID: 342714007
Matrix: SOIL
Collect Date: 04-FEB-14 08:15
Receive Date: 07-FEB-14
Collector: Client
Moisture: <0.1%

Project: WCHN00213
Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA											
SW846 7471B Mercury in Solid "Dry Weight Corrected"											
Mercury	*U	0.00373	0.00373	0.0111	mg/kg	1	NOR1	02/11/14	1024	1365640	1
Metals Analysis-ICP											
ICP METALS 6010TR Close-out List "Dry Weight Corrected"											
Aluminum		128	6.49	19.1	mg/kg	1	HSC	02/12/14	1440	1365353	2
Arsenic	U	0.477	0.477	2.86	mg/kg	1					
Barium		2.22	0.0954	0.477	mg/kg	1					
Beryllium	U	0.0954	0.0954	0.477	mg/kg	1					
Boron	U	0.954	0.954	4.77	mg/kg	1					
Cadmium	U	0.0954	0.0954	0.477	mg/kg	1					
Calcium		99.2	7.64	23.9	mg/kg	1					
Chromium	U	0.143	0.143	0.477	mg/kg	1					
Copper	U	0.286	0.286	0.954	mg/kg	1					
Iron		298	7.64	23.9	mg/kg	1					
Magnesium		49.5	8.11	28.6	mg/kg	1					
Manganese		7.82	0.191	0.954	mg/kg	1					
Molybdenum	U	0.191	0.191	0.954	mg/kg	1					
Nickel	U	0.143	0.143	0.477	mg/kg	1					
Silicon	N J	142	1.43	9.54	mg/kg	1					
Silver	U	0.0954	0.0954	0.477	mg/kg	1	HSC	02/13/14	0957	1365353	3
Sodium	U	6.68	6.68	23.9	mg/kg	1					
Antimony	U	0.315	0.315	0.954	mg/kg	1	HSC	02/14/14	1112	1365353	4
Cobalt	U	0.143	0.143	0.477	mg/kg	1					
Lead	B	0.744	0.315	0.954	mg/kg	1					
Potassium		56.9	6.11	23.9	mg/kg	1					
Vanadium	B	0.387	0.0954	0.477	mg/kg	1					
Zinc	C U J	1.76	0.382	0.954	mg/kg	1					
Metals Analysis-ICP-MS											
SW846 3050B/6020A Selenium "Dry Weight Corrected"											
Selenium	DU	0.308	0.308	1.00	mg/kg	2	SKJ	02/12/14	0445	1365351	5

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3050B	ICP-MS 3050BS PREP	MTM1	02/10/14	0900	1365350
SW846 3050B	SW846 3050B Prep for 6010C	MTM1	02/10/14	0900	1365352
SW846 7471B Prep	SW846 7471B Mercury Prep Soil	AXSS	02/10/14	1653	1365636

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**Metals Fractional Narrative
WC-HANFORD, INC. (WCHN)
SDG XP0049**

Sample Analysis

Sample ID	Client ID
342714001	J1T973
342714002	J1T974
342714003	J1T975
342714004	J1T976
342714005	J1T977
342714006	J1T978
342714007	J1T979
1203032507	Method Blank (MB) ICP
1203032508	Laboratory Control Sample (LCS)
1203032511	342714001(J1T973L) Serial Dilution (SD)
1203032509	342714001(J1T973D) Sample Duplicate (DUP)
1203032510	342714001(J1T973S) Matrix Spike (MS)
1203035887	342714001(J1T973PS) Post Spike (PS)
1203032502	Method Blank (MB) ICP-MS
1203032503	Laboratory Control Sample (LCS)
1203032506	342714001(J1T973L) Serial Dilution (SD)
1203032504	342714001(J1T973D) Sample Duplicate (DUP)
1203032505	342714001(J1T973S) Matrix Spike (MS)
1203033173	Method Blank (MB) CVAA
1203033174	Laboratory Control Sample (LCS)
1203033183	342714001(J1T973L) Serial Dilution (SD)
1203033181	342714001(J1T973D) Sample Duplicate (DUP)
1203033182	342714001(J1T973S) Matrix Spike (MS)
1203033193	342714001(J1T973PS) Post Spike (PS)

The samples in this SDG were analyzed on a "dry weight" basis.

Method/Analysis Information

Analytical Batch: 1365353, 1365351 and 1365640

Prep Batch : 1365352, 1365350 and 1365636
Standard Operating Procedures: GL-MA-E-013 REV# 22, GL-MA-E-009 REV# 22, GL-MA-E-014 REV# 25 and GL-MA-E-010 REV# 27
Analytical Method: SW846 3050B/6010C, SW846 3050B/6020A and SW846 7471B
Prep Method : SW846 3050B and SW846 7471B Prep

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Metals analysis-ICP was performed on a P E 5300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with a Burgener nebulizer, cyclonic spray chamber, and yttrium or scandium internal standard. Operating conditions for the ICP are set at a power level of 1500 watts. The instrument has a peristaltic pump flow rate of 1.4L/min, argon gas flows of 15 L/min and 0.2 L/min for the torch and auxiliary gases, and a flow setting of 0.65L/min for the nebulizer.

The Metals analysis - ICPMS was performed on a Perkin Elmer ELAN 6100E inductively coupled plasma mass spectrometer (ICP-MS). The instrument is equipped with a cross-flow nebulizer, quadrupole mass spectrometer, and dual mode electron multiplier detector. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum. Operating conditions are set at 1400W power and combined argon pressures of 360+/-7 kPa for the plasma and auxiliary gases, and 0.85 L/min carrier gas flow, and an initial lens voltage of 5.2.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm. Sample introduction through the flow injection system is performed via a peristaltic pump at 9 mL/min and nitrogen carrier gas rate of 80 mL/min.

Calibration Information

Instrument Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL Requirements

The CRDL standard recoveries met the advisory control limits except for potassium and lead. Lead recovered high in the PQL standards analyzed in file 021214A-3 at 12:53 and 14:47; however the concentration in the bracketed sample was greater than two times the PQL.

Potassium recovered high the PQL standards analyzed in files 021314-1 at 08:52 and 021414-2 at 11:18; however the client sample concentrations were greater than two times the PQL.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria.

Continuing Calibration Blank (CCB) Requirements

All continuing calibration blanks (CCB) bracketing this batch met the established acceptance criteria.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 342714001 (J1T973)-ICP, ICP-MS and CVAA.

Matrix Spike (MS) Recovery Statement

The percent recoveries (%R) obtained from the MS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The MS did not meet all the recommended quality control acceptance criteria for percent recoveries for the applicable analytes. The silicon recovery was not within the acceptance limits in sample 1203032510 (J1T973)-ICP. See data exception report (DER ID 1267696) behind the case narrative in this data package.

Duplicate Relative Percent Difference (RPD) Statement

The relative percent difference (RPD) obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the contract required detection limit (RL), a control of +/-RL is used to evaluate the DUP results. Not all applicable analytes met these requirements. The RPD value for mercury was not within the acceptance limits in sample 1203033181 (J1T973)-CVAA.

Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the PS analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The PS did not meet the recommended quality control acceptance criteria for percent recoveries for silicon and verifies

the presence of matrix interferences. See data exception report (DER ID 1267696) behind the case narrative in this data package.

Serial Dilution % Difference Statement

The serial dilution is used to assess matrix suppression or enhancement. Raw element concentrations that are 25X the IDL/MDL for CVAA, 50X the IDL/MDL for ICP, and 100X the IDL/MDL for ICP-MS analyses are applicable for serial dilution assessment. All applicable analytes met the acceptance criteria of less than 10% difference (%D).

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions are performed to minimize matrix interferences resulting from elevated mineral element concentrations present in solid samples and/or to bring over range target analyte concentrations into the linear calibration range of the instruments. Dilutions were required for this SDG in order to minimize suppression due to matrix interferences. Samples 342714001 (J1T973), 342714002 (J1T974), 342714003 (J1T975), 342714004 (J1T976) and 342714006 (J1T978)-ICP were diluted because the titanium concentration exceeded the linear range of the instrument which affected antimony, cobalt, lead, vanadium, and zinc. Antimony was suppressed on sample 342714005 (J1T977)-ICP. Samples in this SDG were diluted the standard two times for solids analyzed on the ICPMS.

Preparation Information

The samples in this SDG were prepared exactly according to the cited SOP.

Miscellaneous Information

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Data exception reports (DER ID 126666 and 1267696) were generated for this SDG.

Additional Comments

Additional comments were not required for this SDG.

Certification Statement

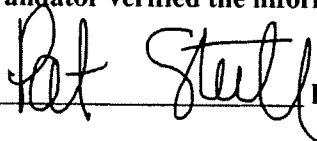
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer: _____

 Date: 02/20/2014

DATA EXCEPTION REPORT			
Mo.Day Yr. 11-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: MERCURY	Test / Method: SW846 7471B	Matrix Type: Solid	Client Code: ALBE, WCHN
Batch ID: 1365640	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 342714(XP0049) Application Issues: Failed RPD for DUP			
Specification and Requirements		DER Disposition:	
Exception Description: 1. Failed RPD for DUP: QC 1203033181DUP		The sample and sample duplicate % RPD failed outside the control limits for mercury due to possible sample non-homogeneity and/or matrix interference. The post spike passed the required control limits for Mercury. This verifies the absence of a matrix interference. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported.	

Originator's Name:
Nik-Cole Elmore 11-FEB-14

Data Validator/Group Leader:
Bryan Davis 11-FEB-14

DATA EXCEPTION REPORT			
Mo.Day Yr. 14-FEB-14	Division: Industrial	Quality Criteria: Specifications	Type: Process
Instrument Type: ICP	Test / Method: SW846 3050B/6010C	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1365353	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 342714(XP0049) Application Issues: <i>Failed Recovery for MS/PS</i>			
Specification and Requirements		DER Disposition:	
Exception Description: 1. Failed Recovery for MS/PS: QC 1203032510MS,1203035887PS		1. The matrix spike recovery failed outside of the control limits for silicon. The post spike failed outside the required control limits for silicon but passed for all other analytes. This verifies the presence of a matrix interference for silicon and verifies the absence of a matrix interference for all the other analytes. Per GEL's accredited methods and SOPs, a corrective action is not required and the data is qualified and reported. Sample #342714001 is a finely grated granular solid.	

Originator's Name:

Helen Camello

14-FEB-14

Data Validator/Group Leader:

Jerry Wigfall

14-FEB-14

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			RC-232-075	Page 1 of 2
Collector JOHNSON, BRADY	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8B	Data Turnaround	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-382 Subsites	SAF No. RC-232	7 Day			
Ice Chest No. WCH-12-016	Field Logbook No. EL-1666-01	COA 0603822000	Method of Shipment Commerical Carrier - fed Ex			
Shipped To GEL Laboratories Charleston	Offsite Property No. A131049	BRI of Lading/Air Bill No. See O5PC				

Other Labs Shipped To NA	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
	Type of Container	GP	aG	aG	aG	aG					
	No. of Container(s)	1	1	1	1	1					
	Volume	125mL	125mL	125mL	250mL	125mL					
	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8081; Chloro-Herbicides - EPA8151	PCBs - 8082					

POSSIBLE SAMPLE HAZARDS/REMARKS
None

Special Handling and/or Storage
cool 4c
342714

Sample No.	Matrix	Sample Date	Sample Time										
J1T973	SOIL	2.4.14	0820	X	X	X	X	X					
J1T974	SOIL	2.4.14	0850	X	X	X	X	X					
J1T975	SOIL	2.4.14	0920	X	X	X	X	X					
J1T976	SOIL	2.4.14	0940	X	X	X	X	X					
J1T977	SOIL	2.4.14	1000	X	X	X	X	X					

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Brad Johnson	2-4-14 1000	R. Fabian	2-4-14 1010
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
R. Fabian	2-4-14 1530	C. Bingham	2-4-14 1530
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Bingham	2-4-14 1535	1060 Battelle, Frdge	2-4-14 1535
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
1060 Battelle, Frdge	2-5-14 1025	C. Bingham	2-5-14 1025
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Bingham	2-5-14 1030	fed Ex	2-5-14
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Fedex	0207H 0907	P. Kent Patrick, Dent	2-7-14 09:00
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)

REVIEWED BY
K. Wood V. [Signature]
DATE
2-5-14

XP0049

WCH-EE-011

342714

Washington Closure Hanford			CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-075		Page 2 of 2		
Collector JOHNSON, BRADY			Company Contact Joan Kessner		Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B		Data Turnaround 7 day	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites			Sampling Location 600-382 Subsites		SAF No. RC-232							
Ice Chest No. WCH-12-016			Field Logbook No. EL-1666-01		COA 0603822000		Method of Shipment Commerical Carrier - Fed Ex					
Shipped To GEL Laboratories Charleston			Offsite Property No. A 131049		Bill of Lading/Air Bill No. See OSPC							
Other Labs Shipped To NA			Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C			
			Type of Container		G/P	a/G	a/G	a/G	a/G			
POSSIBLE SAMPLE HAZARDS/REMARKS None			No. of Container(s)		1	1	1	1	1			
			Volume		125mL	125mL	125mL	250mL	125mL			
			Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8061; Chloro-Herbicides - EPA8151	PCBs - 8062			
Special Handling and/or Storage cool 4c 342714												
Sample No.	Matrix	Sample Date	Sample Time									
J1T978	SOIL	2-4-14	0820	X	X	X	X	X				
J1T979	SOIL	2-4-14	0815	X								
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS				
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<p>(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)</p> <div style="text-align: center;"> </div>				
Brady Johnson		2-4-14/1010		R. Fabian		2-4-14						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time						
R. Fabian		2-4-14 1530		G. Bingham		2-4-14 1530						
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G. Bingham		2-4-14 1535		1060 Battelle Fridge		2-4-14 1535						
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G. Bingham		2-5-14 1030		Fed Ex		2-5-14 0900						
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Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>				
Fedex		020714 0900		P. Kent Patricia Dent		2/7/14 09:00						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>				
Fedex		020714 0900		P. Kent Patricia Dent		2/7/14 09:00						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>				
Fedex		020714 0900		P. Kent Patricia Dent		2/7/14 09:00						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>				
Fedex		020714 0900		P. Kent Patricia Dent		2/7/14 09:00						
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time		<div style="text-align: center;"> </div>				

Appendix 5
Data Validation Supporting Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	C	D	E
PROJECT:	600-382		DATA PACKAGE: XP0048		
VALIDATOR:	ELR	LAB: Gcl	DATE: 4/13/14		
			SDG: XP0045		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg	SW-846 Cyanide		
SAMPLES/MATRIX					
J15973		J15974	J15975	J15976	
J15977		J15978	J15979		
Soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes **No** N/A
 Comments: _____

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? Yes No **N/A**
 Initial calibrations acceptable? Yes No **N/A**
 ICP interference checks acceptable? Yes No **N/A**
 ICV and CCV checks performed on all instruments? Yes No **N/A**
 ICV and CCV checks acceptable? Yes No **N/A**
 Standards traceable? Yes No **N/A**
 Standards expired? Yes No **N/A**
 Calculation check acceptable? Yes No **N/A**
 Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) Yes No N/A

Laboratory blanks analyzed? Yes No N/A

Laboratory blank results acceptable?..... Yes No N/A

Field blanks analyzed? (Levels C, D, E) Yes No N/A

Field blank results acceptable? (Levels C, D, E)..... Yes No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Comments:

214C - 79 - 05FB - 10 detect

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed?..... Yes No N/A

MS/MSD results acceptable?..... Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E)..... Yes No N/A

MS/MSD standards expired? (Levels D, E) Yes No N/A

LCS/BSS samples analyzed?..... Yes No N/A

LCS/BSS results acceptable?..... Yes No N/A

Standards traceable? (Levels D, E)..... Yes No N/A

Standards expired? (Levels D, E) Yes No N/A

Transcription/calculation errors? (Levels D, E)..... Yes No N/A

Performance audit sample(s) analyzed? Yes No N/A

Performance audit sample results acceptable?..... Yes No N/A

Comments:

MS - silicon (09%) - 1 allNo PAS

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST**5. PRECISION (Levels C, D, and E)**

Duplicate RPD values acceptable? Yes No N/A

Duplicate results acceptable? Yes No N/A

MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A

MS/MSD standards expired? (Levels D, E) Yes No N/A

Field duplicate RPD values acceptable? Yes No N/A

Field split RPD values acceptable? Yes No N/A

Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

FD - Silicon 35.8%

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed? Yes No N/A

ICP serial dilution %D values acceptable? Yes No N/A

ICP post digestion spike required? Yes No N/A

ICP post digestion spike values acceptable? Yes No N/A

Standards traceable? Yes No N/A

Standards expired? Yes No N/A

Transcription/calculation errors? Yes No N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

7. FURNACE AA QUALITY CONTROL (Levels D and E)

Duplicate injections performed as required?	Yes	No	N/A
Duplicate injection %RSD values acceptable?	Yes	No	N/A
Analytical spikes performed as required?	Yes	No	N/A
Analytical spike recoveries acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
MSA performed as required?	Yes	No	N/A
MSA results acceptable?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments: _____

8. HOLDING TIMES (all levels)

Samples properly preserved?	Yes	No	N/A
Sample holding times acceptable?	Yes	No	N/A

Comments: _____

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST**9. RESULT QUANTITATION AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Results supported in the raw data? (Levels D, E).....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Samples properly prepared? (Levels D, E).....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Detection limits meet RDL?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
Transcription/calculation errors? (Levels D, E).....	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A

Comments: _____

Appendix 6

Additional Documentation Requested by Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: February 18, 2014

Page 1 of 8

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis - ICPMS											
Batch	1365351										
QC1203032504	342714001	DUP									
Selenium		DU	0.327	DU	0.310	mg/kg	N/A ^		SKJ	02/12/14	03:33
QC1203032503	LCS										
Selenium	4.85		D	4.64	mg/kg		95.7	(80%-120%)		02/12/14	03:10
QC1203032502	MB										
Selenium		DU	0.319	mg/kg						02/12/14	03:04
QC1203032505	342714001	MS									
Selenium	4.96	DU	0.327	D	4.58	mg/kg	92.4	(75%-125%)		02/12/14	03:39
QC1203032506	342714001	SDILT									
Selenium		DU	-0.554	DU	1.64	ug/L	N/A	(0%-10%)		02/12/14	03:51
Metals Analysis-ICP											
Batch	1365353										
QC1203032509	342714001	DUP									
Aluminum			7160		6880	mg/kg	3.96	(0%-20%)	HSC	02/12/14	14:12
Antimony		DU	1.43	DU	1.61	mg/kg	N/A ^			02/14/14	10:37
Arsenic		B	1.63	B	2.26	mg/kg	32.9 ^	(+/-2.93)		02/12/14	14:12
Barium			78.4		74.2	mg/kg	5.54	(0%-20%)			
Beryllium			0.694		0.695	mg/kg	0.159 ^	(+/-0.489)			
Boron		U	0.866	U	0.978	mg/kg	N/A ^				
Cadmium		B	0.113	B	0.101	mg/kg	11.4 ^	(+/-0.489)			
Calcium			2800		2710	mg/kg	3.53	(0%-20%)			
Chromium			11.5		11.5	mg/kg	0.494	(0%-20%)			
Cobalt		D	8.90	D	8.13	mg/kg	9.00 ^	(+/-2.44)		02/14/14	10:37
Copper			11.9		12.3	mg/kg	3.55	(0%-20%)		02/12/14	14:12
Iron			21500		21200	mg/kg	1.66	(0%-20%)			

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch 1365353											
Lead	BD	4.11	D	5.30	mg/kg	25.2 ^		(+/-4.89)	HSC	02/14/14	10:37
Magnesium		3920		4020	mg/kg	2.54		(0%-20%)		02/12/14	14:12
Manganese		359		326	mg/kg	9.63		(0%-20%)			
Molybdenum	B	0.248	B	0.256	mg/kg	3.13 ^		(+/-0.978)			
Nickel		11.3		12.7	mg/kg	12.3		(0%-20%)			
Potassium		1420		1350	mg/kg	5.07		(0%-20%)		02/13/14	09:28
Silicon	N	931		1010	mg/kg	8.14		(0%-20%)		02/12/14	14:12
Silver	U	0.0866	U	0.0978	mg/kg	N/A ^				02/13/14	09:28
Sodium		108		102	mg/kg	5.55 ^		(+/-24.4)			
Vanadium	D	57.9	D	56.3	mg/kg	2.91		(0%-20%)		02/14/14	10:37
Zinc	D	39.8	D	37.7	mg/kg	5.40		(0%-20%)			
QC1203032508 LCS											
Aluminum		474		495	mg/kg		104	(80%-120%)		02/12/14	14:06
Antimony		47.4		47.8	mg/kg		101	(80%-120%)		02/14/14	10:28
Arsenic		47.4		48.4	mg/kg		102	(80%-120%)		02/12/14	14:06
Barium		47.4		49.8	mg/kg		105	(80%-120%)			
Beryllium		47.4		50.7	mg/kg		107	(80%-120%)			
Boron		47.4		49.0	mg/kg		103	(80%-120%)			
Cadmium		47.4		50.2	mg/kg		106	(80%-120%)			
Calcium		474		503	mg/kg		106	(80%-120%)			
Chromium		47.4		48.2	mg/kg		102	(80%-120%)			
Cobalt		47.4		49.8	mg/kg		105	(80%-120%)		02/14/14	10:28

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP										
Batch	1365353									
Copper	47.4		51.0	mg/kg		107	(80%-120%)	HSC	02/12/14	14:06
Iron	474		505	mg/kg		106	(80%-120%)			
Lead	47.4		50.3	mg/kg		106	(80%-120%)		02/14/14	10:28
Magnesium	474		511	mg/kg		108	(80%-120%)		02/12/14	14:06
Manganese	47.4		49.6	mg/kg		105	(80%-120%)			
Molybdenum	47.4		48.1	mg/kg		101	(80%-120%)			
Nickel	47.4		50.2	mg/kg		106	(80%-120%)			
Potassium	474		502	mg/kg		106	(80%-120%)		02/13/14	09:22
Silicon	474		444	mg/kg		93.5	(80%-120%)		02/12/14	14:06
Silver	47.4		50.0	mg/kg		105	(80%-120%)		02/13/14	09:22
Sodium	474		486	mg/kg		103	(80%-120%)			
Vanadium	47.4		49.1	mg/kg		103	(80%-120%)		02/14/14	10:28
Zinc	47.4		48.9	mg/kg		103	(80%-120%)			
QC1203032507 MB										
Aluminum		U	6.44	mg/kg					02/12/14	14:03
Antimony		B	-0.412	mg/kg					02/14/14	10:24
Arsenic		U	0.473	mg/kg					02/12/14	14:03
Barium		U	0.0947	mg/kg						
Beryllium		U	0.0947	mg/kg						
Boron		U	0.947	mg/kg						
Cadmium		U	0.0947	mg/kg						
Calcium		U	7.58	mg/kg						

GEL LABORATORIES LLC

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch 1365353											
Chromium			U	0.142	mg/kg				HSC	02/12/14	14:03
Cobalt			U	0.142	mg/kg					02/14/14	10:24
Copper			U	0.284	mg/kg					02/12/14	14:03
Iron			U	7.58	mg/kg						
Lead			U	0.313	mg/kg					02/14/14	10:24
Magnesium			U	8.05	mg/kg					02/12/14	14:03
Manganese			U	0.189	mg/kg						
Molybdenum			U	0.189	mg/kg						
Nickel			U	0.142	mg/kg						
Potassium			U	6.06	mg/kg					02/13/14	09:19
Silicon			U	1.42	mg/kg					02/12/14	14:03
Silver			U	0.0947	mg/kg					02/13/14	09:19
Sodium			B	-15.6	mg/kg						
Vanadium			U	0.0947	mg/kg					02/14/14	10:24
Zinc			B	0.692	mg/kg						
QC1203032510 342714001 MS											
Aluminum	492		7160	9050	mg/kg		N/A	(75%-125%)		02/12/14	14:15
Antimony	49.2	DU	1.43	D	47.2	mg/kg	96	(75%-125%)		02/14/14	10:40
Arsenic	49.2	B	1.63		51.5	mg/kg	101	(75%-125%)		02/12/14	14:15
Barium	49.2		78.4		127	mg/kg	99.1	(75%-125%)			
Beryllium	49.2		0.694		51.1	mg/kg	102	(75%-125%)			
Boron	49.2	U	0.866		48.5	mg/kg	97.7	(75%-125%)			

GEL LABORATORIES LLC

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch	1365353										
Cadmium	49.2	B	0.113	49.6	mg/kg		101	(75%-125%)	HSC	02/12/14	14:15
Calcium	492		2800	3520	mg/kg		N/A	(75%-125%)			
Chromium	49.2		11.5	59.7	mg/kg		98.1	(75%-125%)			
Cobalt	49.2	D	8.90	D	62.5	mg/kg	109	(75%-125%)		02/14/14	10:40
Copper	49.2		11.9	65.3	mg/kg		109	(75%-125%)		02/12/14	14:15
Iron	492		21500	22400	mg/kg		N/A	(75%-125%)			
Lead	49.2	BD	4.11	D	55.5	mg/kg	104	(75%-125%)		02/14/14	10:40
Magnesium	492		3920	4550	mg/kg		N/A	(75%-125%)		02/12/14	14:15
Manganese	49.2		359	370	mg/kg		N/A	(75%-125%)			
Molybdenum	49.2	B	0.248	48.6	mg/kg		98.4	(75%-125%)			
Nickel	49.2		11.3	60.2	mg/kg		99.6	(75%-125%)			
Potassium	492		1420	1960	mg/kg		110	(75%-125%)		02/13/14	09:31
Silicon	492	N	931	N	739	mg/kg	0 *	(75%-125%)		02/12/14	14:15
Silver	49.2	U	0.0866	50.4	mg/kg		102	(75%-125%)		02/13/14	09:31
Sodium	492		108	637	mg/kg		108	(75%-125%)			
Vanadium	49.2	D	57.9	D	110	mg/kg	107	(75%-125%)		02/14/14	10:40
Zinc	49.2	D	39.8	D	93.2	mg/kg	109	(75%-125%)			
QC1203035887 342714001 PS											
Silicon	5000	N	10700	23100	ug/L		246 *	(80%-120%)		02/14/14	10:31
QC1203032511 342714001 SDILT											
Aluminum			82600	D	16900	ug/L	2.4	(0%-10%)		02/12/14	14:18
Antimony		DU	-5.61	DU	7.15	ug/L	N/A	(0%-10%)		02/14/14	10:43
Arsenic		B	18.8	DU	2.17	ug/L	N/A	(0%-10%)		02/12/14	14:18

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-ICP											
Batch 1365353											
Barium		905	D	184	ug/L	1.75		(0%-10%)	HSC	02/12/14	14:18
Beryllium		8.01	D	1.69	ug/L	5.32		(0%-10%)			
Boron	U	4.99	DU	4.33	ug/L	N/A		(0%-10%)			
Cadmium	B	1.30	DU	0.433	ug/L	N/A		(0%-10%)			
Calcium		32400	D	6640	ug/L	2.56		(0%-10%)			
Chromium		132	D	28.0	ug/L	5.86		(0%-10%)			
Cobalt	D	20.5	D	3.78	ug/L	8		(0%-10%)		02/14/14	10:43
Copper		137	D	27.0	ug/L	1.38		(0%-10%)		02/12/14	14:18
Iron		248000	D	51400	ug/L	3.33		(0%-10%)			
Lead	BD	9.49	D	3.60	ug/L	89.4		(0%-10%)		02/14/14	10:43
Magnesium		45200	D	9380	ug/L	3.73		(0%-10%)		02/12/14	14:18
Manganese		4150	D	862	ug/L	4.01		(0%-10%)			
Molybdenum	B	2.86	DU	0.866	ug/L	N/A		(0%-10%)			
Nickel		130	D	26.3	ug/L	1.2		(0%-10%)			
Potassium		16400	D	3370	ug/L	2.87		(0%-10%)		02/13/14	09:34
Silicon	N	10700	D	2190	ug/L	2.08		(0%-10%)		02/12/14	14:18
Silver	U	-3.99	DU	0.433	ug/L	N/A		(0%-10%)		02/13/14	09:34
Sodium		1250	D	315	ug/L	26.5		(0%-10%)			
Vanadium	D	134	D	26.7	ug/L	.146		(0%-10%)		02/14/14	10:43
Zinc	D	91.9	D	18.5	ug/L	.384		(0%-10%)			

Metals Analysis-Mercury
Batch 1365640

GEL LABORATORIES LLC

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QC Summary

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

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Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch	1365640										
QC1203033181	342714001	DUP									
Mercury		*U	0.00398	*	0.0272	mg/kg	208**^	(+/-0.0117)	NOR1	02/11/14	10:05
QC1203033174	LCS										
Mercury	0.120				0.118	mg/kg	98.2	(80%-120%)		02/11/14	09:54
QC1203033173	MB										
Mercury			U	0.00387	mg/kg					02/11/14	09:52
QC1203033182	342714001	MS									
Mercury	0.117	*U	0.00398		0.119	mg/kg	102	(80%-120%)		02/11/14	10:07
QC1203033193	342714001	PS									
Mercury	2.00	*U	-0.009		1.96	ug/L	98.2	(80%-120%)		02/11/14	10:14
QC1203033183	342714001	SDILT									
Mercury		*U	-0.009	DU	0.0199	ug/L	N/A	(0%-10%)		02/11/14	10:12

Notes:

The Qualifiers in this report are defined as follows:

- * Duplicate analysis not within control limits
- + Correlation coefficient for Method of Standard Additions (MSA) is < 0.995
- B The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate).
- C Target analyte was detected in the sample and the associated blank, and the sample concentration was <= 5 times the blank concentration.
- D Results are reported from a diluted aliquot of sample.
- E Reported value is estimated due to interferences. See comment in narrative.
- M Duplicate precision not met.
- N Spike Sample recovery is outside control limits.
- S Reported value determined by the Method of Standard Additions (MSA)
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- W Post-digestion spike recovery for GFAA out of control limit. Sample absorbency < 50% of spike absorbency.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Date: 14 April 2014
To: Washington Closure Hanford Inc. (technical representative)
From: ELR Consulting
Project: 100-IU-2 & 100-IU-6 Remaining Waste Sites – Soil Full Protocol - Waste Site 600-382
Subject: Diesel Range Organics - Data Package No. XP0049-GEL

INTRODUCTION

This memo presents the results of data validation on Data Package No. XP0049 prepared by GEL Laboratories (GEL). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analyte
J1T973	2/4/14	Soil	C	See note 1
J1T974	2/4/14	Soil	C	See note 1
J1T975	2/4/14	Soil	C	See note 1
J1T976	2/4/14	Soil	C	See note 1
J1T977	2/4/14	Soil	C	See note 1
J1T978	2/4/14	Soil	C	See note 1

1 – Diesel range organics by NWTPH-d.

Data validation was conducted in accordance with the Washington Closure Hanford (WCH) validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (DOE/RL-96-22, September 2009). Appendices 1 through 6 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Data Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Analytes must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-

detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were acceptable.

Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field (equipment) Blanks

No field blanks were submitted for analysis.

Accuracy

Matrix Spike/Matrix Spike Duplicate & Blank Spike Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries below control limits are qualified as estimates and flagged "UJ". Undetected sample results are not qualified if the spike recovery is above control limits. Sample results greater than five times the spike concentration require no qualification.

All accuracy results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to the surrogate being diluted out, all diesel range organic and motor oil results in samples J1T973 and J1T978 were qualified as estimates and flagged "J".

All other surrogate results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-30%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All duplicate results were acceptable.

Field Duplicate Samples

One set of field duplicates (J1T973/J1T978) were submitted for analysis. Field duplicates are compared using the same criteria as for laboratory duplicates. The RPD for diesel range organics (43.6%) was outside QC limits. Under the WCH statement of work, no qualification is required. All other field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the required quantitation limits (RQL's) to ensure that laboratory detection levels meet the required criteria. All analytes met the RQL.

Completeness

Data package No. XP0049 was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

The following minor deficiencies were noted:

- Due to the surrogate being diluted out, all diesel range organic and motor oil results in samples J1T973 and J1T978 were qualified as estimates and flagged "J".

Data flagged "J" indicates that the associated concentration is an estimate, but under the WCH statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

Washington Closure Hanford Contract #S00W307A00 (March 2008), *Data Validation Services*, March 2008.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, U.S. Department of Energy, September 2009.

Appendix 1
Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the WCH validation SOW are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

DIESEL RANGE ORGANICS DATA QUALIFICATION SUMMARY*

SDG: XP0049	REVIEWER: ELR	Project: 600-382	PAGE <u>1</u> OF <u>1</u>
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Diesel range organics Motor oil	J	J1T973, J1T978	Surrogate recovery

* - The Qualified Data Summary Table includes laboratory applied "U" qualifiers not specifically identified here. The laboratory applied "U" qualifiers are included to minimize misinterpretation of results contained in the table.

Appendix 3
Annotated Laboratory Reports

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
 Address : 2620 Fermi Avenue
 MSIN H4-21
 Richland, Washington 99354
 Contact: Joan Kessner
 Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T973
 Sample ID: 342714001
 Matrix: SOIL
 Collect Date: 04-FEB-14 08:20
 Receive Date: 07-FEB-14
 Collector: Client
 Moisture: 1.85%

Project: WCHN00213
 Client ID: WCHN001

✓
 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	DJ	126000	55100	170000	ug/kg	25	BYT1	02/16/14	1704	1366736	1
Motor Oil (C20-C36)	D	1660000	55100	170000	ug/kg	25					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	02/14/14	1730	1366735
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/12/14	1008	1366135

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	NWTPH-Dx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	0.00 ug/kg	678	0.00*	(50%-150%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T974
Sample ID: 342714002
Matrix: SOIL
Collect Date: 04-FEB-14 08:50
Receive Date: 07-FEB-14
Collector: Client
Moisture: 14.8%

Project: WCHN00213
Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	J	4060	2540	7820	ug/kg	1	BYT1	02/16/14	1743	1366736	1
Motor Oil (C20-C36)		53800	2540	7820	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	02/14/14	1730	1366735
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/12/14	1008	1366135

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	NWTPH-Dx in Soil				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	632 ug/kg	782	80.8	(50%-150%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T975
Sample ID: 342714003
Matrix: SOIL
Collect Date: 04-FEB-14 09:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 9.67%

Project: WCHN00213
Client ID: WCHN001

✓ 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	J	2770	2400	7370	ug/kg	1	BYT1	02/16/14	1821	1366736	1
Motor Oil (C20-C36)		39500	2400	7370	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	02/14/14	1730	1366735
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/12/14	1008	1366135

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
1	NWTPH-Dx in Soil				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	648 ug/kg	737	87.9	(50%-150%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T976
Sample ID: 342714004
Matrix: SOIL
Collect Date: 04-FEB-14 09:40
Receive Date: 07-FEB-14
Collector: Client
Moisture: 3.47%

Project: WCHN00213
Client ID: WCHN001

W 4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2240	2240	6900	ug/kg	1	BYT1	02/16/14	1900	1366736	1
Motor Oil (C20-C36)		18100	2240	6900	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	02/14/14	1730	1366735
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/12/14	1008	1366135

The following Analytical Methods were performed:

Method	Description	Analyst Comments			
I	NWTPH-Dx in Soil				
Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	576 ug/kg	690	83.5	(50%-150%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 558-8171 - www.gel.com

Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T977
Sample ID: 342714005
Matrix: SOIL
Collect Date: 04-FEB-14 10:00
Receive Date: 07-FEB-14
Collector: Client
Moisture: 2.76%

Project: WCHN00213
Client ID: WCHN001

✓
4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Diesel Range Organics											
SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"											
Diesel Range Organics (C10-C20)	U	2210	2210	6810	ug/kg	1	BYT1	02/16/14	1939	1366736	1
Motor Oil (C20-C36)	J	5950	2210	6810	ug/kg	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	02/14/14	1730	1366735
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/12/14	1008	1366135

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	NWTPH-Dx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	539 ug/kg	681	79.1	(50%-150%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: February 18, 2014

Company : WC-Hanford, Inc.
Address : 2620 Fermi Avenue
MSIN H4-21
Richland, Washington 99354
Contact: Joan Kessner
Project: RC-232 Soil

Client SDG: XP0049

Client Sample ID: J1T978
Sample ID: 342714006
Matrix: SOIL
Collect Date: 04-FEB-14 08:20
Receive Date: 07-FEB-14
Collector: Client
Moisture: 1.72%

Project: WCHN00213
Client ID: WCHN001

4/13/14

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
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Diesel Range Organics

SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"

Diesel Range Organics (C10-C20)	DJ	80900	54700	168000	ug/kg	25	BYT1	02/16/14	2018	1366736	1
Motor Oil (C20-C36)	D	1270000	54700	168000	ug/kg	25					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3541	3541 DRO IN SOIL PREP	AXV1	02/14/14	1730	1366735
SW846 3541	3541 DRO IN SOIL PREP	CXR2	02/12/14	1008	1366135

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	NWTPH-Dx in Soil	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
o-Terphenyl	SW 3541/NWTPH-Dx in Soil "Dry Weight Corrected"	0.00 ug/kg	673	0.00*	(50%-150%)

Notes:

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

**FID Diesel Range Organics
WC-HANFORD, INC. (WCHN)
SDG XP0049**

Method/Analysis Information

Procedure: Analysis of Diesel Range Organics by Flame Ionization Detector
Analytical Method: NWTPH-Dx in Soil
Prep Method: SW846 3541
Analytical Batch Number: 1366736
Prep Batch Number: 1366735

Sample Analysis

The following samples were analyzed using the analytical protocol as established in NWTPH-Dx in Soil:

Sample ID	Client ID
342714001	J1T973
342714002	J1T974
342714003	J1T975
342714004	J1T976
342714005	J1T977
342714006	J1T978
1203036054	Method Blank (MB)
1203036055	Laboratory Control Sample (LCS)
1203036058	342714006(J1T978) Matrix Spike (MS)
1203036059	342714006(J1T978) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-003 REV# 24.

Raw data reports are processed and reviewed by the analyst using the Chemstation software package. False positives have been removed from the quantitation reports per standard operating procedures (SOP).

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

Continuing Calibration Verification (CCV) Requirements

The associated calibration verification standards (CCV) did not meet the acceptance criteria.

The CCV standard bracketing the samples in this SDG recovered slightly above the acceptance limits for Diesel Range Organics; however, this had no adverse effects on the data as the detection of Diesel Range Organics was below the PQL in all affected samples.

Surrogate recovery did not meet the acceptance criteria in the CCV standard analyzed for this SDG; however, this had no adverse effects on the data as all undiluted samples in this SDG recovered well within the acceptance limits for the surrogate.

Analyte peaks eluted within the established retention time windows for this method.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Surrogate Recoveries

Samples 1203036058 (J1T978MS), 1203036059 (J1T978MSD), 342714001 (J1T973) and 342714006 (J1T978) did not meet surrogate recovery acceptance criteria due to dilution.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Sample 342714006 (J1T978) was selected for the matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS, performed on sample 342714006 (J1T978), did not meet spike recovery acceptance criteria due to dilution, sample matrix interference and high level of target analytes in the parent sample.

Matrix Spike Duplicate (MSD) Recovery Statement

The MSD, performed on sample 342714006 (J1T978), did not meet spike recovery acceptance criteria due to dilution, sample matrix interference and high level of target analytes in the parent sample.

MS/MSD Relative Percent Difference (RPD) Statement

The RPD between the MS and MSD met the acceptance limits.

Technical Information

Holding Time Specifications

GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP. Analyte peaks eluted within the established retention time windows for this method.

Sample Dilutions

Samples 1203036058 (J1T978MS), 1203036059 (J1T978MSD), 342714001 (J1T973) and 342714006 (J1T978) were diluted due to the presence of over-range target analytes.

Sample Re-extraction/Re-analysis

All samples in this SDG were extracted and analyzed twice due to quality issue in the first analysis. The second analysis was reported.

Miscellaneous Information

Electronic Package Comment

This package was generated using an electronic data processing program referred to as "virtual packaging". In an effort to increase quality and efficiency, the laboratory is developing systems to eventually generate all data packages electronically. The following change from "traditional" packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative.

Data Exception (DER) Documentation

Data exception report (DER) is generated to document procedural anomalies that may deviate from referenced SOP or contractual documents. DER #1268157 was generated for this SDG.

Manual Integrations

Certain standards and samples may have required manual integration to correctly position the baseline as set in the calibration standard injections. If manual integration was performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

Additional Comments

The additional comments field is used to address special issues associated with each analysis, clarify method/contractual issues pertaining to the analysis, and to list any report documents generated as a result of sample analysis or review. The additional comments were not required.

System Configuration

The Diesel Range Organics analysis was performed on the following instrument configuration:

Instrument ID	Instrument	System Configuration	Column ID	Column Description
FID7.I	Agilent Gas Chromatograph	Agilent 6890N GC/FID	DB-5MS	30m x 0.25mm, 0.25um(J&W)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

DATA EXCEPTION REPORT

Mo. Day Yr. 17-FEB-14	Division: Federal	Quality Criteria: Specifications	Type: Process
Instrument Type: GC/FID	Test / Method: NWTPH-Dx in Soil	Matrix Type: Solid	Client Code: WCHN
Batch ID: 1366736	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 342554(XP0048), 342714(XP0049)

Application Issues:

Failed Yield for Surrogates

Failed Recovery for MSD/PSD

**Specification and Requirements
Exception Description:**

1. Samples 342714006 and its QC samples 1203036058(MS)/1203036059(MSD) did not meet surrogate recovery acceptance criteria.
2. The QC samples 1203036058(MS) and 1203036059(MSD), performed on sample 342714006, did not meet spike recovery acceptance criteria.
2. The MSD(1203036057), performed on sample 342554001, recovered motor oil at 65%(SPC Limit: 70%-130%).

DER Disposition:

- 1 & 2. Samples were diluted due to over-range target analyte. As a result, the surrogates and/or spiked analytes were diluted out of their acceptance limit. The data were reported.
2. The failure was due to high level of Motor Oil range organics in the parent sample. The data were reported.

Originator's Name:

Benjamin Taft

17-FEB-14

Data Validator/Group Leader:

Jimin Cao

18-FEB-14

Washington Closure Hanford		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST			RC-232-075	Page 1 of 2
Collector JOHNSON, BRADY	Company Contact Joan Kessner	Telephone No. 375-4688	Project Coordinator KESSNER, JH	Price Code 8B	Data Turnaround	
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites	Sampling Location 600-382 Subsites	SAF No. RC-232	7 Day			
Ice Chest No. WCH-12-016	Field Logbook No. EL-1666-01	COA 0603822000	Method of Shipment Commerical Carrier - fed EX			
Shipped To GEL Laboratories Charleston	Offsite Property No. A131049	Bill of Lading/Air Bill No. See OSC				

Other Labs Shipped To NA	Preservation	Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C					
	Type of Container	GP	aG	aG	aG	aG					
	No. of Container(s)	1	1	1	1	1					
	Volume	125mL	125mL	125mL	250mL	125mL					
	Sample Analysis	See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 5310	Pesticides - 6081; Chloro-Herbicides - EPA6151	PCBs - 6082					

POSSIBLE SAMPLE HAZARDS/REMARKS

None

Special Handling and/or Storage

cool 4C

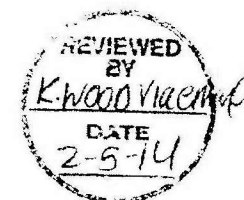
342714

Sample No.	Matrix	Sample Date	Sample Time										
J1T973	SOIL	2-4-14	0820	X	X	X	X	X					
J1T974	SOIL	2-4-14	0850	X	X	X	X	X					
J1T975	SOIL	2-4-14	0920	X	X	X	X	X					
J1T976	SOIL	2-4-14	0940	X	X	X	X	X					
J1T977	SOIL	2-4-14	1000	X	X	X	X	X					

CHAIN OF POSSESSION		Sign/Print Names	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
Brad Johnson	2-4-14/1000	R. Fahibers	1010
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
B. Fahibers	2-4-14 1530	C. Bingham	1530
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Bingham	2-4-14 1535	1060 Battelle, Fred	1535
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
1060 Battelle, Fred	2-5-14 1025	C. Bingham	1025
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
C. Bingham	2-5-14 1030	fed EX	
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time
fed EX	0207H 0901	P. Vent	09:00

SPECIAL INSTRUCTIONS

(1) ICP Metals - 6010TR (Close-out List) (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Vanadium, Zinc); Mercury - 7471 - (CV) (Mercury)



XP0049

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time
WCH-EE-011			

Washington Closure Hanford				CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST					RC-232-076		Page 2 of 2								
Collector JOHNSON, BRADY				Company Contact Joan Kessner			Telephone No. 375-4688		Project Coordinator KESSNER, JH		Price Code 8B		Data Turnaround 7 day						
Project Designation 100-IU-2 & 100-IU-6 Remaining Waste Sites				Sampling Location 600-382 Subsites			SAF No. RC-232												
Ice Chest No. WCH-12-016				Field Logbook No. EL-1666-01			COA 0603822000		Method of Shipment Commercial Carrier - FedEx										
Shipped To GEL Laboratories Charleston				Offsite Property No. A 131049			Bill of Lading/Air Bill No. See OSPC												
Other Labs Shipped To NA				Preservation		Cool 4C	Cool 4C	Cool 4C	Cool 4C	Cool 4C									
				Type of Container		G/P	aG	aG	aG	aG									
POSSIBLE SAMPLE HAZARDS/REMARKS None				No. of Container(s)		1	1	1	1	1									
				Volume		125mL	125mL	125mL	250mL	125mL									
				Sample Analysis		See item (1) in Special Instructions	TPH-Diesel Range - WTPH-D +	PAHs - 8310	Pesticides - 8081; Chloro-Herbicides - EPA8151	PCBs - 8082									
Special Handling and/or Storage cool 4c 342714																			
Sample No.		Matrix	Sample Date	Sample Time															
J1T978		SOIL	2-4-14	0820	X	X	X	X	X										
J1T979		SOIL	2-4-14	0815	X														
CHAIN OF POSSESSION																			
Relinquished By/Removed From					Date/Time					Received By/Stored In					Date/Time				
Brady Johnson					2-4-14/1000					R. Fahlberg					2-4-14/1010				
Relinquished By/Removed From					Date/Time					Received By/Stored In					Date/Time				
R. Fahlberg					2-4-14/1530					C. Bingham					2-4-14/1530				
Relinquished By/Removed From					Date/Time					Received By/Stored In					Date/Time				
C. Bingham					2-4-14/1535					1060 Battelle Fridge					2-4-14/1535				
Relinquished By/Removed From					Date/Time					Received By/Stored In					Date/Time				
1060 Battelle Fridge					2-5-14/1025					C. Bingham					2-5-14/1025				
Relinquished By/Removed From					Date/Time					Received By/Stored In					Date/Time				
C. Bingham					2-5-14/1030					Fed EX									
Relinquished By/Removed From					Date/Time					Received By/Stored In					Date/Time				
Fedex					020714/0900					P. Dent					2/7/14/0900				
Relinquished By/Removed From					Date/Time					Received By/Stored In					Date/Time				
FINAL SAMPLE DISPOSITION																			
Disposal Method					Disposed By					Date/Time									

Appendix 5
Data Validation Supporting Documentation

GENERAL ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT:	600-382		DATA PACKAGE: XP0049		
VALIDATOR:	ELR	LAB:	Gcl	DATE: 4/18/14	
			SDG: XP0049		
ANALYSES PERFORMED					
8015	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G	<u>WTPH-D</u>	
SAMPLES/MATRIX:					
J15973 J15974 J15975 J15976					
J15977 J15978					
soil					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present? Yes No N/A

Comments: _____

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

Initial calibrations acceptable? Yes No N/A
 Continuing calibrations acceptable? Yes No N/A
 Standards traceable? Yes No N/A
 Standards expired? Yes No N/A
 Calculation check acceptable? Yes No N/A

Comments: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) Yes No N/A
 Calibration blank results acceptable? (Levels D, E) Yes No N/A
 Laboratory blanks analyzed? Yes No N/A
 Laboratory blank results acceptable? Yes No N/A
 Field/trip blanks analyzed? (Levels C, D, E) Yes No N/A
 Field/trip blank results acceptable? (Levels C, D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: no FB

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed? Yes No N/A
 Surrogate/system monitoring compound recoveries acceptable? Yes No N/A
 Surrogates traceable? (Levels D, E) Yes No N/A
 Surrogates expired? (Levels D, E) Yes No N/A
 MS/MSD samples analyzed? Yes No N/A
 MS/MSD results acceptable? Yes No N/A
 MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
 MS/MSD standards expired? (Levels D, E) Yes No N/A
 LCS/BSS samples analyzed? Yes No N/A
 LCS/BSS results acceptable? Yes No N/A
 Standards traceable? (Levels D, E) Yes No N/A
 Standards expired? (Levels D, E) Yes No N/A
 Transcription/calculation errors? (Levels D, E) Yes No N/A
 Performance audit sample(s) analyzed? Yes No N/A
 Performance audit sample results acceptable? Yes No N/A

Comments: 73 + 74 - surr 0% - July

no TRS

GENERAL ORGANIC DATA VALIDATION CHECKLIST

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? Yes No N/A
Duplicate results acceptable? Yes No N/A
MS/MSD standards NIST traceable? (Levels D, E) Yes No N/A
MS/MSD standards expired? (Levels D, E) Yes No N/A
Field duplicate RPD values acceptable? Yes No N/A
Field split RPD values acceptable? Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A

Comments: _____

FD - DRO - 436%

6. HOLDING TIMES (all levels)

Samples properly preserved? Yes No N/A
Sample holding times acceptable? Yes No N/A

Comments: _____

GENERAL ORGANIC DATA VALIDATION CHECKLIST**8. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)**

Results reported for all requested analyses? Yes No N/A
Results supported in the raw data? (Levels D, E) Yes No N/A
Samples properly prepared? (Levels D, E) Yes No N/A
Detection limits meet RDL? Yes No N/A
Transcription/calculation errors? (Levels D, E) Yes No N/A
Comments: _____

9. SAMPLE CLEANUP (Levels D and E)

Fluorocil ® (or other aborbant) cleanup performed? Yes No N/A
Lot check performed? Yes No N/A
Check recoveries acceptable? Yes No N/A
Check materials traceable? Yes No N/A
Check materials Expired? Yes No N/A
Analytical batch QC given similar cleanup? Yes No N/A
Transcription/Calculation Errors? Yes No N/A
Comments: _____

Appendix 6
Additional Documentation Requested by Client

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: February 18, 2014

Page 1 of 2

WC-Hanford, Inc.
2620 Fermi Avenue
MSIN H4-21
Richland, Washington
Joan Kessner

Contact:

Workorder: 342714

Client SDG: XP0049

Project Description: RC-232 Soil

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Diesel Range Organics											
Batch	1366736										
QC1203036055	LCS										
Diesel Range Organics (C10-C20)	66600			53800	ug/kg		80.7	(70%-130%)	BYT1	02/16/14	13:10
Motor Oil (C20-C36)	66600			57900	ug/kg		86.9	(70%-130%)			
**o-Terphenyl	666			537	ug/kg		80.6	(50%-150%)			
QC1203036054	MB										
Diesel Range Organics (C10-C20)			U	2160	ug/kg					02/16/14	12:31
Motor Oil (C20-C36)			U	2160	ug/kg						
**o-Terphenyl	666			513	ug/kg		77.1	(50%-150%)			
QC1203036058	342714006 MS										
Diesel Range Organics (C10-C20)	67600	DJ	80900 DJ	156000	ug/kg		112	(70%-130%)		02/16/14	20:57
Motor Oil (C20-C36)	67600	D	1270000 D	1560000	ug/kg		N/A	(70%-130%)			
**o-Terphenyl	676		0.00	0.00	ug/kg		0 *	(50%-150%)			
QC1203036059	342714006 MSD										
Diesel Range Organics (C10-C20)	67400	DJ	80900 DJ	135000	ug/kg	14.5	80.7	(0%-20%)		02/16/14	21:36
Motor Oil (C20-C36)	67400	D	1270000 D	1390000	ug/kg	11.8	N/A	(0%-20%)			
**o-Terphenyl	674		0.00	0.00	ug/kg		0 *	(50%-150%)			

Notes:

The Qualifiers in this report are defined as follows:

- A The TIC is a suspected aldol-condensation product
- B The analyte was detected in both the associated QC blank and in the sample.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of sample.
- E Concentration exceeds the calibration range of the instrument
- J The analyte was detected at a value less than the contract required detection limit (RDL), but greater than or equal to the IDL/MDL (as appropriate). Value is estimated